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DEVOTED TO THE PHILOSOPHY OF SCIENCE

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THE MONIST

SOME IDEAS CONCERNING BIOLOGICAL HEREDITY[1].

HITHERTO the theories of heredity most discussed by biologists have been those of Darwin and Weismann. To these might be added the hypotheses of Spencer and Galton.[2] Galton's hypothesis is a modification of Darwin's theory of Pangenesis, and is at the same time an approach to the theory of Weismann, for Galton antedates Weismann in maintaining the non-inheritance of acquired characters.

On re-examining the theories above mentioned, I was reminded of the hypothesis of Leibnitz, who, in his endeavor to explain the conception of original sin (which according to the Christian faith is transmitted from father to son), as a degenerate condition of the human soul which therefore has need of redemption to free itself from it, had recourse to the hypothesis that souls are contained in the seed from Adam down; that therefore there has been no new creation of souls from the beginning, because Adam contained all that were to be born and united with their future bodies by means of a pre-established harmony.

No philosopher after Leibnitz accepted this theory because it

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[1] Translated from the MS. of Prof. Giuseppe Sergi, of the University of Rome, Italy, by I. W. Howerth, Ph. D., of the University of Chicago.

[2] Spencer, *Principles of Biology*, Vol. I.; Darwin, *The Variation of Animals and Plants, under Domestication*, Chap. 27; Galton, "The Theory of Heredity," *Journal of Anthropological Institute*, Vol. V:, 1876; Weismann, *Essais sur l'hérédité et la sélection*, Paris, 1892. Cf. Romanes, *An Examination of Weismannism*, Chicago, 1893; also his *Darwin and After Darwin*, Chicago, 1897.

does not seem rational. It appears to me, however, that the theories of heredity, especially the latest and the one most discussed, namely, that of Weismann, bear a strong resemblance to the Leibnitzian. For the germ plasm, like the stirps of Galton, is also supposed to have been contained in the primal ancestor, is equally immortal, like the soul of the spiritualist, and descends through the sexual cells, which are "the seed" of Leibnitz. The metaphysics is complete, and Galton himself is constrained to admit that it is necessary to theorise.[1] I shall not here enter into an extended discussion of the various theories of heredity proposed by Darwin and Weismann and by the opponents of the latter, because it would lead me beyond the limits of this paper. Since, however, from Darwin to Weismann there have arisen supporters and adversaries of the two principal hypotheses of evolution, the Darwinian and the Lamarckian, which are closely connected with heredity, I may say a word bearing upon the latter subject.

The gemmules of Darwin are derived from the cells which compose a multicellular organism, and are collected in the reproductive glands to form the two sexual elements from which a new organism is derived. It is not said that these gemmules, that is, the ovules and the spermatozoa, are immortal and in every organism substantially the same as in the parent organism; but it is said that they may be transmitted without having undergone any change to distant descendants where they may develop and produce the phenomenon of atavism.

So Darwin, while attempting to explain the appearance of atavistic forms, presented an hypothesis upon the heredity of specific forms. At the same time, he had to reconcile the persistence of such forms with the variations which are indispensable to explain the origin of species under the influence of natural selection. Darwin was, therefore, in a certain sense Lamarckian, because he admitted the influence of the environment upon the organism, and the effects of the use and disuse of organs.

The idea of the stability of these gemmules is still more ob-

[1] "We are therefore forced to theorise." *Op. cit.*, p. 335.

vious in the theory of Galton, who called them "stirps," to which he attributed continuity, as does Weismann to germ-plasm. Galton declared emphatically that the stirps are only slightly subject to variation, and he opposed the validity of the theory of external action in heredity. That is to say, he admitted the nontransmissibility of acquired characters, except in a very few cases.

Weismann is the uncompromising advocate of the theory of the unaltered continuity of the germ-plasm, which, according to him, descends unvaried from generation to generation, and hence also of the nontransmissibility of acquired characters. Really I ought not to say that Weismann is a rigid supporter of his own doctrine, for he has modified it many times and has finally conceded that sometimes the hereditary transmission of acquired characters takes place. Now I wish to consider a certain phase of Weismannism, which is still in vogue in Italy and elsewhere, in order to show that it is theoretically untenable, and it is only theoretically that it is maintained, in so far as it regards the origin of variation in relation to natural selection. I shall endeavor to do this, because up to the present time no biologist has considered it in the same light.

Since the germ-plasm of Weismann is not subject to any influence, and only the somatic cells may undergo variation, it is natural that no individual variation may be transmitted by heredity. But the fact of variations exists, and it cannot be denied that there are transmissible or transmitted variations without forestalling ourselves from speaking of the origin of species, of selection, etc. Hence Weismann, constrained by the nature of the facts, admitted from the first that transmissible variations are only those which are produced in unicellular organisms, for he believed that the germ-plasm occupied the whole cellular substance which, therefore, could be directly modified by external influences. It might be said that Weismann was a Lamarckian only as regards unicellular organisms. But when a substantial distinction was made between the nucleus and the content of the cell, Weismann could no longer maintain this position, and the question of the possibility of hereditary variations even in unicellular organisms was raised.

There is only a single means, according to Weismann, whereby hereditary individual differences could take place, and that is sexual reproduction or amphigony. "It is well known that this process consists," he says, "in the coalescence of two distinct germ-cells, or perhaps only of their nuclei. These germ-cells contain the substance, the germ-plasm, and this again, owing to its specific molecular structure, is the bearer of the hereditary tendencies of the organism from which the germ-cell has been derived. In this amphigonic reproduction two groups of hereditary tendencies are as it were combined. I regard this combination as the cause of hereditary individual characters, and I believe that the production of such characters is the true significance of amphigonic reproduction. The object of this process is to create those individual differences which form the material out of which natural selection produces new species." [1]

Conceding to Weismann this proposition, we must ask him how it happens that in the two sexes, or better, in the two sexual cells, the variation of the germ-plasm is produced. For we must admit that the ovule and the sperm-cell contain like elements, being derived from organisms which had no original sexual differences, and that the variation in the ovule or the sperm cell did not constitute a variation in the germ-plasm which is found in the nucleus and is derived from an asexual organism. But Weismann does not answer this question. On the contrary, he supposes these conditions as an original fact.

Now, it seems clear to me that the origin of sex must not be sought in the germ cells, for these depend principally upon conditions external to the cells themselves, that is to say, upon particular conditions of the parent and of nutrition. Hence, if no variation in the germ-plasm is found at the beginning, none can ever be found, and the two cells, the ovule and the sperm cell, must have like germ-plasm, because, according to Weismann, they cannot undergo any alteration from the influence of the somatic cells. The mixing in sexual reproduction, then, cannot be the cause of heredi-

[1] *Essais cit.*, p. 320.

tary individual variation no matter how great the number of successive generations.

Suppose, with Weismann, that the variations of the germ-plasm had originated in the unicellular organisms in the manner which he at first believed, that is, by the direct action of external causes. Still we could not admit that the multicellular organisms derived from them would have carried the variations acquired in the germ-plasm, and would have originated the innumerable variations which are found in the species. Such variations of unicellular organisms would have been limited, and would not have been able to produce all these effects, because as soon as unicellular organisms became multicellular they would have lost the condition of being able to undergo modifications through external influences, and would have been arrested at the first or most elementary variations already acquired in the unicellular condition. That is to say, there could not have been produced the innumerable species of animals and plants which now exist, and no natural selection could have been exercised.

Weismann, then, abandons even the possibility of variation in unicellular organisms. Since the germ-plasm is contained only in the nucleus, the way is closed, according to his own theory, to any variation even in these organisms. Even when unicellular organisms reproduce by amphigony they could only carry an unvarying and invariable plasma.

We may ask, then, How has it been possible that such a theory as that of Weismann could have attracted so much attention from the biologists of every country? I confess that it astonishes me to see it maintained by eminent zoölogists and naturalists of every sort, and so long discussed.[1]

* * *

Turning now to the general conception of the hypotheses concerning heredity, I believe I can explain why it is that a substance called gemmule, stirp, idioplasm, and said to be immortal, unvaried and more or less invariable, is supposed to exist. It is doubtless

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[1] Cf. Romanes, *op. cit.*

the desire to find a basis for the fact of the conservation of forms in species and, in general, in the types of living beings of the two organic kingdoms, animal and vegetable. It is thought that without such a special substratum, separate, according to the theory of Weismann, from every other vital element, there could not be any stability of living forms. And since the variation in individuals is continuous and hence visible in every case, there has not been allowed to such variations the importance and the influence upon the reproduction of forms that they merit. Variations through external action resemble planetary perturbations, which are not capable of throwing a celestial body out of the orbit in which it is held invariably and eternally by virtue of the attraction of a greater body.

But this is a philosophic speculation, and represents the tendency of almost every thinker to seek for the occult and the mysterious. As I have already said, it seems to me that, from Darwin to Weismann, the hypotheses on heredity, multiplied in a few years, are analogous to that of Leibnitz concerning a pre-established harmony and the transmission of souls by means of reproduction, all of which souls being supposed to have been created at one time and no more afterwards, for no more were necessary. It is true that the gemmules and the germ-plasm are multiplied by division, but, according to Weismann, it is always the same substance, hence immortal. He attributes immortality to unicellular organisms.

The same speculation and the same hypothesis should be valuable even in another kingdom which has forms more definite and more stable than the animal or vegetable kingdom, namely, the mineral. Why not assume a special substratum for the production of mineral crystals as well as for the production of animal types?

Now, I ask, Why not seek a foundation for the stability of the reproduction of living forms which is simpler in its characters and more natural? Why recur to the hypothesis of an occult substance with occult qualities? Casual observation reveals in nature and in all its manifestations a tendency to stability, a perennial conservation in all its manifestations and energies, like the inertia of bodies

or the unaltered continuity of the laws of nature, which, while they may seem transitory, appear as constant phenomena.

To change this natural stability in a single manifestation it is necessary that superior forces act in determinate conditions. For instance, to separate the molecules cohering in a substance there must be a force which is superior to that of cohesion; to dissolve a crystal it is necessary that there be a condition which destroys that which has produced it and conserves it. In spite of the various energies which may disturb the movement of a celestial body it will always move in its orbit with great stability and constancy. So it may be affirmed that the succession of the phenomena of nature is constant in spite of the fact that there are disturbing causes. Chemical combinations, physical phenomena, transformation of energy, all speak of the continuity of natural manifestations.

We do not find it necessary, then, to invent a new alchemy treating of heredity in the two kingdoms of life. Man has had, and has yet, the tendency to occultism, it may be even with a scientific appearance, and to explain the phenomena of life he has invented now a *nisus formativus*, now a vital force, now a psychic, like the simple and immortal soul, now the spirit of the spiritualists, now the immutable and immortal germ-plasm.

The stability and the continuity which exist in all the phenomena of nature ought to reappear in the phenomena of life, which is also one of the phenomena of nature. The constant succession of living forms with the same characters is the most evident demonstration of this stability. In studying the micro-organisms, protophytes, and protozoa, one may observe the constancy of their forms and appearance. This constancy appears in the uninterrupted chain of heredity. If a living being could be born without the existence of another which precedes it, that is, without a parent, there would be no continuity and hence no stability. On the contrary there would be an interruption of the phenomena of law. Hence generation constitutes a continuity in succession, and heredity, a constancy in the reproduction of living forms.

The cell of the most minute and elementary organism is derived from a cell, and, as we know, by division. The formative

element is inclosed in the nucleus, and is that part which contains the energy and the center of vitality. From it there is an expansion of energy which is multiplied by generation, that is, by the cell's dividing itself and collecting in the protoplasmic substances surrounding it new nutritive elements. In such division and multiplication the individual cell cannot produce new individuals different from itself in form and function. In accordance with the stability of nature it produces homogenous individuals. In this phenomenon presented in its elementary form, it is not necessary to create an occult substance, a special plasm which is multiplied and generates new individuals while remaining unvaried and immortal. If anything immortal exists it is the form or the morphological characters of the living being. The living substance which has accumulated energy tends to expand, and is expanded by functioning or by dividing itself through successive generations.

Considering always the generation of a unicellular organism in the manner described, it is easy to understand that the living nuclear substance divided into two new and young individuals must be inferior in quantity and in energy to the mother substance or the generating individual if it is not increased by means of nutrition. But this is what happens, and then the new individual becomes like that from which it is generated, with the same amount of substance and equivalent energy. In this process, yet very simple, the form does not change, there is no condition to change it, and this happens in accordance with the fact noted above in every phenomenon of nature, namely, the conservative stability which constitutes the constancy and continuity of nature.

Whoever will observe closely the individuals of a unicellular type may find in them some variation, either in size or in length of cilia, if they are ciliated, etc. We may say that in their reproduction the type is perfectly conserved and the forms are constantly reproduced, but there is some deviation, which, however, does not in the least alter the type in its essential characters. This deviation constitutes the individual variation of the type.

What are the causes of these individual variations? How does it happen that the perennial constancy of forms may undergo varia-

tions in the succession of generations? Here new forces which are external, also natural, enter into action and exert an influence above that of these organisms, as happens with reference to other substances and forms of nature. We have said that a planet always describes its elliptical orbit around the star which attracts it, in spite of the perturbations which may be produced by other celestial bodies outside of its orbit. The attractive force of the sun is greater than that exerted upon the planet by other bodies. Hence it is held in its orbit. But these other bodies cause the planet to describe a curve irregular at certain points, and so the orbit, while preserving its elliptical form, may become sinuous.

If we consider that various forms of energy external to the living organism may act upon it, we may easily understand that some force may disturb its natural development and so produce a deviation from the parent type. Whatever be the circumstances, they may have their influence. Take, for instance, the ease or difficulty of finding food, its abundance or scarcity. In the minutest organisms this is perhaps one of the commonest conditions producing a variation in the individuals. But the environment in which they are born and are developed may undergo a change. In this manner we may conceive a series of influences which may be favorable or unfavorable to the conservation of the natural persistence of the organisms in their forms and corresponding functions. Thus there may be a condition which will produce a deviation from the type without destroying it, that is, may produce individual variations.

Without going beyond the generation of micro-organisms, in which the reproduction of forms seems simplest and more constant, and easier also to interpret, because we do not yet find in them a complexity of tissues and of organs, we may show, as a manifestation of the natural stability of living forms, some very important and at the same time surprising examples.

We do not know why it is that some protozoa have undergone such changes in reproduction as to acquire the mode of generation by spores. Under such circumstances the developing organism must pass through a series of changes and undergo considerable

transformations before it reaches the form of the type from which it originated. *Colpoda cucullus* (Fig. 1) shows admirably the various phases of development and the various metamorphoses through which the animal, which is an infusorian, passes before acquiring the definitive form. But it finally reaches it. Now, this demonstrates to us how, in spite of a series of deviations in the embryonal stage through which the *colpoda* passes, the typical form reappears constantly as a fact illustrating the persistence and stability of nature. Probably from the beginning external forces have acted with

Fig. 1.
Evolution of *Colpoda cucullus*. (After Rumbler.)

great energy upon the micro-organism which assumed the encysted state to pass to generation by division. These causes may have coöperated with the reproductive energy to produce in the interior of the organism a great number of cells which, owing to the conditions in which they were born, could not have the same form as the cell born by division and whose form is complete, and identical to the mother cell. From this fact arises the necessity of freeing the embryonal cells or spores from their imprisonment. And these must undergo various phases of development before completing themselves in the adult form.

Whoever will observe the reproduction and the variations of *colpoda* will wonder why it must pass through so many changes. These changes are indicated in Fig. 1. *A* is the infusorian in its adult and typical form; in *B* it has reached the encysted state; in *C* and *D* there is a reduction of its volume, and the loss of its cilia. In *E* spores have been produced, and *F* represents the rupture of the envelope and the issue of the spores; the transformation of the spores *G* is visible successively in *H*, *J*, *K*, and *L*, in which the growing spore assumes the form of an amœba and then of a flagellata. Finally by degrees the typical form reappears in *R*. One might say that there has been a period of struggle between the natural stability of forms and the deviation determined by extraneous and external causes, but that stability, while undergoing temporary variations in the period of development, has finally conquered.

I have no need to create a germ-plasm with characters special and absolutely distinct from the other plasma which constitutes the body of the animal organism, to explain the reproduction of *colpoda*. Nor shall I be constrained to establish such a germ-plasm for the simple or primordial reproduction which takes place by division. The nuclear substance is sufficient to explain the phenomenon. In simple division there is the production of a new nucleus from the primitive nucleus, as an emanation from the latter, which is augmented by nutritious materials. In the formation of the spores in *colpoda* and other similar micro-organisms, I think we find the same phenomenon with an important variation arising from generative multiplication. That is to say, the nucleus undergoes a greater number of divisions, is protected as to the particles in which it is divided, by nutritive protoplasm and the tegument, in order that they may have time to develop themselves freely and under favorable conditions. Hence the same plasma which constitutes the most active part of the organism is that which is involved in the reproduction and multiplication of the organism itself. The reproduction of the type itself with its own morphological and functional characters, depends, as I have said, upon a natural stability or inertia which never varies unless a greater force acts upon the organism or upon the living substance of the various organisms.

Unless this is the case these organisms reproduce invariably the forms from which they are derived. It may be said, varying the signification, that there exists that fixity of species which the biologists before Darwin considered the effect of the original creation.

The transition from the production of spores to the production of sexual cells, ovule and sperm cell, resembles the transition from nuclear division to the production of spores. When an organism becomes complex and composed of many cells, and these are transformed into different tissues, it is no longer possible to observe cellular division as a means of reproduction, nor the production of spores which occupy and absorb the whole generating substance, as a means of reproductive multiplication. In composite organisms there must naturally and necessarily be a separation of the reproductive substance by another method. And this living reproductive substance must find a place to deposit itself and to await maturity and development.

Now, when we consider the conditions of more evolved animal life, we find two very special secretive organs, the spermatic glands of the male and the ovaries of the female. These two organs, which have also a special structure, are charged with collecting that which serves for the reproduction of the future organism and of forming it into characteristic cells, that is, the egg-cell and the sperm-cell. So a reproductive cell derived from a composite organism, for example, a vertebrate, a bird, a reptile, or a mammal will reproduce one of those types of animals from which it is directly derived. This always happens, and it is because of that natural stability and everlasting continuity which will neither change nor vary unless superior forces act momentarily or constantly to produce a variation and deviation from the type to which the organism belongs.

Now, in the individual evolution of an organism, let us suppose a mammal, the fertilised egg-cell is multiplied in the ordinary manner, that is to say, by division, as in micro-organisms, and in consequence of multiplication by segmentation it is divided and subdivided into parts which are to constitute the organs in the living adult. Among these organs are found also those which must serve

in sexual reproduction. I mean the ovaries and spermatic glands, with all those accessories which serve afterwards in reproduction. The two cells from which the individual is derived, or from which the tissues and organs are derived, do not already contain the living organism as an adult in microscopic proportions. There is no need to accept this old hypothesis. They contain the potentiality of developing themselves and reproducing individuals of the very same forms and with the very same functions as those organisms from which they originate, and this always by the continuous persistence of nature which does not vary without a sufficient cause.

I do not admit that in the sexual cells special elements are found which in the variation of the organism become muscles, bones, or nerves. I hold on the contrary that when the egg-cell is multiplied into numerous cells and has then formed the well-known layers, each of these layers evolves into those tissues and then into those organs which originally represented nerves, muscles, bones, etc. And here again we see the stability of nature, because we find that the parts which in the embryo are evolved into nerve tissue, for example, correspond to the very parts which in the variations of the organism constitute the external element in contact with natural agents, and hence served in the defence of the organism. A similar thing might be said of the parts which produce the organs of nutrition, etc. That is to say, stability is not only conserved in individual reproduction but also in the evolution and formation of species or general types, genera and species.

So, there is nothing pre-established, but on the contrary, all depends upon the constant stability of nature, and therefore nothing is variable except when acted upon by a force superior to that stability.

I have said that there are two organs charged with the production of sexual cells. These two organs begin to appear, like all the other organs, in the embryo. In the fœtus at maturity may be seen the glands which may serve in reproduction when the individual shall have arrived at puberty. Is it necessary that these organs, ovaries and spermatic glands, collect the germ-plasm of Weismann, the gemmules of Darwin or the stirps of Galton? I

think not. It is only necessary that they give form to special cells with special functions, functions which are reduced to those of developing and reproducing the entire individual with all its organs and special tissues; as the cells of the derm reproduce nerve-tissue, those of the mesoderm, the connective tissue, etc. The office of the fertilised egg-cell is more extensive, for it may produce, by segmentation, cells which are disposed in layers, external, middle, and internal. These layers then generate the tissues and the organs. So, while in reproduction by division and by spores, the reproductive element is the integral part of the generating individual, in sexual reproduction by means of sexual cells the reproductive element is a secretion of organs deputised to the special office of reproduction.

Sexual reproduction at first takes place by the employment of the whole living substance which composes an individual which has no sex; then in the employment of the substance of two distinct individuals, and finally in the employment of only a part of the substance of distinct individuals which have assumed a sexual character.

How the first takes place is shown in the reproduction by simple division of a unicellular organism (Fig. 2) and in reproduction by spores which are the transformation of the whole living substance into many other organisms by means of the spore element. But there may be an important variation in this latter phenomenon which may give rise to sexual reproduction, or at least may represent the transition to it.

Professor Delpino recently made a very important study of reproduction and of the origin of sex.[1] This investigation was conducted principally upon vegetables where it is easier to observe and to experiment than it is upon animals. He finds and describes six types of fecundation, two kinds extracellular and four intracellular. These types show with much evidence the origin and evolution of sexual fecundation. The first type is especially interesting in this connexion. It is that of the naked and undifferen-

[1] *Revista di Scienze Biologiche.* Anno. II., 4–5. Como.

tiated gonoplasts, called sexual zoospores, or zoogonides, or planogametes, by different authors. Zoogonides is the name proposed by Delpino himself, and I adopt it. These plants are algae, whose mode of generation is of the first type, and Delpino affirms that they belong to seven families which are the most ancient of the stock. Notice what happens: a cell (zoogonange) contains a plasma which is subdivided into many globules destined to be individualised into gonoplasts. By the rupture of the walls of the

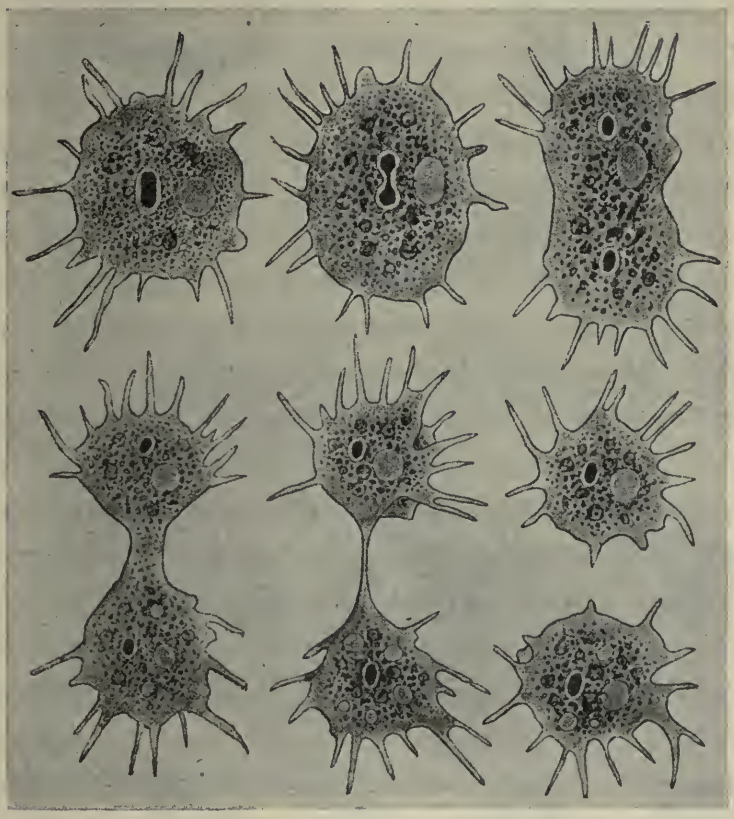

Fig. 2.

Amœba polypodia in six successive phases of scission. (After Schulze.)

zoogonangio, the globules issue forth and take on the pyriform figure with two cilia, by means of which they propel themselves rapidly through the water, and a beak. In their movement they encounter each other, unite in couples and finally fuse into one cell which becomes the new individual (Fig. 3). Delpino himself noticed that all the zoogonides do not find and unite themselves with others. Some are fixed, and like the spores, are developed into new individuals. That is, it may happen that their reproduction

may be agamic and sexual at the same time. There is here no illustration of real sexuality, but there is the origin of it, as appears from the second type mentioned by Delpino.

Without entering into the other very important problems concerning the origin of sex, so ably treated by Delpino, I wish to point out the fact that with this first type of fecundation, so admir

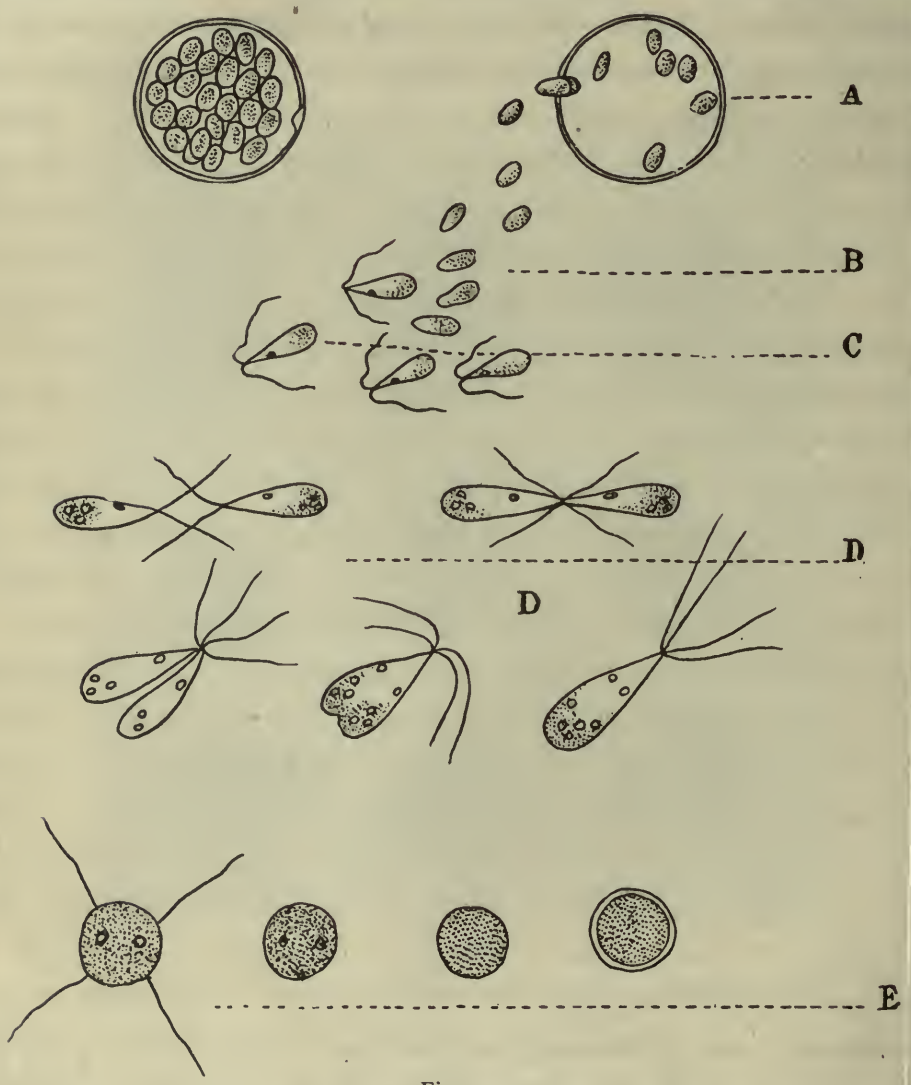

Fig. 3.

(*A*) Two cells (zoogonanges) with plasma divided into globules. (*B*) Globules which have assumed a pyriform figure with a beak and two vibratile cilia. (*C*) The corpuscles in movement naked gonoplasts). (*D*) The gonoplasts are united in couples and afterwards begin the process of fusion. (*E*) The successive stages (from left to right) up to the formation of the complete cell. (Delpino.)

ably described by him, we have the transition from reproduction by spores to sexual reproduction, and that in this transition is employed, as in the spores, the whole generative substance.

In a second stage of sexual reproduction we find the masculine and feminine elements distinct; but even in this case is equally employed the whole living parent substance, which is transformed into two sexual elements.

Finally there is a sexual reproduction in which only a small part of the parent substance is employed. This part is separated by a process which I have called secretion; two special organs, the ovaries and the spermatic glands, being constituted for the reproductive office. This third stage must naturally appear to be the most highly developed and the most perfect, because in this case the life of the parent is not sacrificed, as in the preceding cases. The parents survive and continue to produce new descendants without injury to their living substance. And it is the same with animals as with plants.

Hence, according to my conception of reproduction, whatever be the type or the stage of evolution of its scisions,—spores, or sexual union in the incipient or in the evolved form,—it is not necessary to admit the existence of a substance distinct from the living substance, which circulates and is transformed in every living individual and which has the predestined office of reproducing and of transmitting itself eternally without changing or varying, like the germ-plasm of Weismann. In the simpler living beings, which are agamic or amphygonic in the primordial forms, the living substance is all transformed into the reproductive elements with the death of the individual, and it is always and invariably the identical parent substance which is found in the individuals and in their descendants. So, also, in the higher and complete form of sexual reproduction, in which only a portion of the substance is employed, we may see that it must always be the same, and not another hidden and separate substance which assumes the reproductive office. The separation by means of sexual organs has taken place by a division of labor in the vital functions, especially from the time when the organisms began to have special tissues with their own functions, and when the utility of the individual's conservation became equal to that of the descendant.

If the heredity of forms is on account of the natural stability

of which I have spoken, which stability is like a force of resistance to all changes which may be produced by exterior influences, it follows that variations in organisms may take place only through the operation of forces which in special circumstances overcome the resistance exerted by nature against every change. This is the first condition for the production of variations in living organisms whether animals or plants. But this condition exists, because the living substance is in continuous and direct communication with external energies. In them and through them it lives and is preserved and even multiplies itself. Let us suppose that certain aquatic animals live in the sea at a profound depth and may also live at the surface. They are able to stand a definite aquatic pressure, let us say one hundred. Their organism is adapted to such a pressure, and when subjected to it, the parts are maintained in their normal condition. Their visceral cavities sustain no injury if they ascend to the surface or descend to the depth of a few meters beyond the average. Let us suppose, now, that by chance some of these animals which live at the surface are carried by some force to the depth of two thousand meters. Then, the aquatic pressure must be enormously increased, as, for example, to the extent of the difference between the weight of a column of water one hundred meters high and another of two thousand. Such animals could not resist so high a pressure and would perish. But let us suppose that some one of them does survive. This one will be slowly modified to resist such high pressure. The external force in this case is superior to the natural stability which resists changes, and overcomes it; and consequently the changes are produced.

But the objection of the Weismann theory, and in part that of Galton, is made, not against the possibility of variations which may be produced in individuals, but against their heredity. The same example serves us here. If such changes should not take place in the animal which survived at the profound depth to enable it to support the great pressure, it would not continue to live but would perish without descendants. We have supposed that the changes take place. Such changes are variations useful to the continuance of life. Without them this could not happen. Such variations

are transmissible because a descendant of such an animal, if it should not inherit such variations, would perish and there would be no further descendants.

It is curious to notice that Weismann, in combating Nägeli's theory of a self-modifying idioplasm, insists that the environment may modify an organism in the direction of adaptation. He chooses the whale as an example. "The whale," he says, "is a placental mammal, which, probably in secondary times, arose from terrestrial mammalia by adaptation to aquatic life. Everything that is characteristic of these animals depends upon adaptation."[1] This being admitted, Weismann enters upon a description of the particular facts which distinguish whales as aquatic mammals from other terrestrial mammals, and finds that their organs are modified precisely by the new conditions of life in which they live. But the interpretation he makes of this phenomenon is, to say the least, strange. For he must invoke sexual reproduction to account for variations which are hereditary, if the germ-plasm cannot vary and the somatic variations are not hereditary. On the contrary, it seems to me that the adaptation implies that the somatic modifications are hereditary, supposing even that the somatic plasma is distinct or separate from the germ-plasm, as Weismann would wish to do. And it seems to me useless to invoke sexual reproduction to explain the fact, which fact does suppose the heredity of newly acquired characters.

My conception, then, concerning the heredity of acquired characters is that if such variations are useful to the species, animal or vegetable, they become hereditary, that is, permanent in the species, because they form an integral part of the organism which lives under conditions from which it cannot escape. If, however, the variations are superficial, that is, are not necessary to the species to enable it to continue to live and to leave descendants, then they may be hereditary but are not necessarily so. They may be transitory or individual. The higher examples, as of the fishes of the Plankton or the Necton, which pass into the fishes of

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[1] *Op. cit.*, p. 309 et seq.

the Benthos, and that of the whale of Weismann, show that the modifications or variations undergone in the new environment are necessary to the continuation of the life of the one and of the other. Hence they are not transitory, but are permanent and therefore hereditary.

I might yet say something in the way of explaining atavistic characters. I might construct an hypothesis as to how it happens that in the germ-cells, the ovule and the sperm-cell, the elements which reproduce the individuals from which these cells are derived may be found. But I have no intention of presenting a new theory of heredity, which would not be difficult to do, however, with a little use of the imagination. My purpose has been to show that the theories hitherto set forth are not only incapable of interpreting the facts of heredity but, what is more, they render them more complicated; that these theories are also a reappearance of occultism, because they seek for new plasma and admit occult virtues, as do the Vitalists and the Spiritualists; and that to interpret heredity as a general phenomenon it is enough to hold fast to the universal fact of the stability of nature, while variations imply the action of a force which modifies the organisms, which organisms, by the same natural persistence, must continue to live in the various conditions of their existence. I have sought to show by what means nature brings about descent and heredity in the different forms of reproduction, of which forms sexual reproduction is the highest and most evolved. In this form, therefore, individual existence is preserved because only a small portion of the living substance is employed in reproduction, and this substance is separated by a process common in vital functioning, namely, animal secretion. To my mind, therefore, the only plasma is that which composes the life-substance of all living beings, vegetal and animal, that is, the substance which Weismann would call somatic; and the germ plasm is in every case a derivation from it.

G. Sergi.

Rome, April, 1901.

PHILOSOPHY OF RELIGION AND THE ENDOWMENT OF NATURAL THEOLOGY.

IT has become a commonplace that the nineteenth century was an era of criticism, of destruction, of unrest. This view may or may not be true. And although the phrase has been bandied from mouth to mouth till many deem it a platitude, the time for final judgment lies still in the future. But if, the average opinion notwithstanding, there be room for wide difference on this point, all will admit that, during the period just closed, accumulation was never so rapid, so varied. Old sciences have undergone veritable transformations, strange and startling investigations have put in their claim for recognition, often with bewildering success. As a significant consequence, it is almost impossible for our contemporaries to think themselves back to the climate of opinion that marked the days when Laplace wielded primacy. Men have become so familiar with modern methods and are so saturated with another spirit that they tend frequently to forget the very recent origin of several important and transforming movements, and thus exact demands in these fresh spheres which, if not unwarrantable, at least omit to reckon with the lapse of time necessary for complete achievement or even for adequate insight. At the moment, it were superfluous to enumerate the lines of research where this phenomenon shows itself; suffice it to say that Philosophy of Religion is one. For this study, all things considered, was among the by-products thrown off during the momentous idealistic upheaval that overtook Germany between 1780 and 1850. No doubt, it might be argued fairly and with no small success that, prior, say, to such a notable landmark as Hegel's *Vorlesungen über die*

Philosophie der Religion, of 1829, this aspect of philosophy had acquired prominence. Yet, on the whole, if the Neoplatonic movement be ruled out, the chief principles incident to the study as understood now, prove sadly to seek. Some few mystics hit upon them in part, but, otherwise, dogmatic presuppositions tended to confine investigation within narrow or traditional limits. In the early Church, for example, apologetics gave an unscientific twist to the study everywhere. During the Middle Ages, the regnant conditions decreed an alliance between theology and philosophy, usually to the subservience, if not always the detriment, of the latter. Even the great movement of Arabian thought, the single source of light throughout many dark years, scintillated mainly by contrast with Christian prejudice; for, even here, the shadow of theological dogmatism threw pressing problems into shade effectually. An earnest of better things sprang from the Renascence, with Nicolas of Cusa, Bruno, and Campanella. Yet, even at this, the reactionary forces of the time, coupled with the rapid rise of rationalism, proved all too strong, and the "symbolical" or "mystical" theology, as it was called, passed away leaving no definite traces. Similarly, one cannot recall too often that the Reformation centered in a politico-ecclesiastical, not in an intellectual, alteration. The systematic thought of the Reformers does not differ in essentials from that of Augustine. The preconceived "plan of salvation" descended to the new presbyters who, in matters philosophical, proved as hopeless as the old priests. Thought found a prescribed task awaiting,—to bolster up dogma; and outside of Christianity, as materialised by Mediævalism, naught was conceived to lie but the sure road to damnation. Certainly, the mystics gleam here and there amid distressful obscurantists. But, for all their insight, they cannot stray far from self, and so relapse incontinently into a darkness of their own or blossom into pietists, recking little so be they find a safe road to a safe heaven.

Now, two conditions are prerequisite to successful prosecution of Philosophy of Religion;—complete deliverance from dogmatic reservation, and an atmosphere such that the work done may meet with response. Till the eighteenth century, both happened to be

lacking. With the gradual awakening of this century—the *sæculum rationalisticum*—to self-consciousness, the necessary freedom becomes more and more possible, even if the temper of the age, like its knowledge, hardly favor the indispensable genetic or organic standpoint. So much was this the case that a principal part of the early task of Philosophy of Religion happened to be the emancipation of thought, particularly the thought of the English-speaking peoples, from the mechanical categories of Natural Theology. What this Natural Theology was and implied we must try to see; for, thanks to several wealthy persons, it has been endowed lavishly in Britain within the past seventy years. And this endowment is notable, not only in itself, but also because it throws a light upon certain limitations of English thought, in the cisatlantic as well as in the transatlantic branch, of moment for our present inquiry.

Natural Theology, then, was an outgrowth of the Deistic movement. In this connexion it may be well to premise that the distinctive tenets of Deism by no means exhaust its interest for the discussion upon which we are about to enter. Indeed, one might go so far as to allege that they do not exhaust its chief lessons. For, deep significance must be attached to the fact that, on fundamentals, the Deistic leaders and their opponents, like Bishop Butler, agree. In a word, they are unanimous in adopting the same attitude towards the universe; the theory that satisfied the heterodox party commended itself equally to the orthodox. Moreover it consisted essentially in the scheme which nineteenth century thought has always striven to overthrow. Possibly, the best way to present it is by contrasting the Deistic standpoint with that occupied by representative churchmen of the time.

As usual, the question at issue dealt with revelation. In opposition to the churchmen, the Deists contended that, on inspection of history and society, a "natural religion" can be detected. That is to say, altogether apart from the special advantages which, as Lessing thought later, might be derived from revelation, mankind possesses at least a belief in God, and an ideal of duty. Of course, on this allegation, the problem of revelation is only post-

poned. For the real question comes to be, Is this all that one can say? Are we not forced to go beyond it in order to explain the facts? Taking the Deistic school in the large sweep of its teaching, the answer is in the negative decidedly. Such adumbration of Philosophy of Religion as may be detected consisted in conducting Religion to the bar of Reason, and putting the inquiry, Is "positive" religion amenable to explanation by rational means? The reply admits of no equivocation. On analysis (rational) of "positive" religion, all elements essential to its being and influence are traceable to man's natural endowment. Everything else can be classed legitimately as non-essential. In brief, those factors or accompaniments of religion that reason fails to span have their causes in non-religious influences. Loose thinking, for example, may be saddled with responsibility for much that masquerades as revelation. Similarly, the convenience of governments, or the machinations of a designing priesthood, account for other "divine" factors. As Bolingbroke has it, "Religion is a bridle in the mouth of the sensual mob." Further, if religion in general be susceptible to such treatment, no exception need be made in favor of Christianity. On the contrary, at its origin, Christianity happened to afford a typical specimen of "rational" or "natural" religion. All the excrescences added to it in the course of the ages were nothing but corruptions—unwarrantable interferences due to lapses of the Church from pristine purity, or to her unholy alliance with crafty politicians. Consequently, an important office of rational criticism was to purge away such additions, leaving nothing but the original, uncontaminated product. If to-day we could find an orthodoxy untouched by the atmosphere of modern science, and if similar arguments could be directed against it, what a fluttering would be caused in the dovecots! Nevertheless, bitter although controversy then was—running in some cases to the length of persecution—the amazing thing is that it did not go further. Almost invariably, we find a party in the Church which perceived the advantages of the freedom and toleration desired by the Deists. For instance, Paley, the Cambridge professor of Divinity, speaking of the Anglican Church, says, let her "discharge from her liturgy controversies

unconnected with devotion; let her try what may be done for all sides, by worshipping God in that generality of expression in which He Himself has left some points; let her dismiss many of her articles, and convert those which she retains into terms of peace; let her recall the terrors she suspended over freedom of inquiry; let the toleration she allows to dissenters be made *absolute;* let her invite men to search the Scriptures; let her governors encourage the studious and learned of all persuasions; let her do this, and she will be secure of the thanks of her own clergy, and, what is more, of their sincerity. A greater consent may grow out of inquiry than many are at present aware of." When one remembers some modern controversies, this may seem sufficiently wonderful. But, when the matter is subjected to closer examination, wonder takes flight.

Little as they may have been conscious of it, the truth was that Deists and churchmen possessed no profound reasons for quarrel, because, in their general conception of the nature of the universe, they agreed at bottom. And this constitutes the central point of interest for us now. The seventeenth and eighteenth centuries became gradually dominated more and more by that theory of things known as the "Newtonian philosophy." Fundamentally, this depended on the hypothesis of gravitation. Matter is characterised by two properties—gravitation and inertia. Thus, the problem of its ultimate constitution need not be attacked forthwith; but, seeing that a field so extensive lies fallow in connexion with the properties, may well be put off. Pursuant to this, the properties were found to be attached to certain masses of matter, moving in empty space. Thus, to explain the universe, it is sufficient, meantime, to investigate the relations of these masses to each other, and to describe their behavior. If the inquisitive inquire, How did the properties get there? the ready answer is, They were caused by an Agent. On the side of theology, so long as you confine yourself to discussion of the properties, you occupy the Deistic standpoint; while, the moment you ask how they came into the universe, you side with the churchmen. But, whether you choose one alternative or the other, your theory of the completed system

of things remains identical in essentials. Accordingly, just as secular learning divides itself into two separate portions, one dealing with relations involved in the properties of matter (science), the other dealing with the problem of guarantees (metaphysics), so in theology you cannot avoid a parallel classification. Natural Theology discusses design, or the evidence presented by nature through unaided human reason; that is, it passes from consequnce to antecedent, but entirely without the help of revelation. On the contrary, Revealed Theology pivots upon miracle, or the direct interference of the divine Author with his designs—to accomplish particular purposes not contemplated in the original plan. The point to be made is just this: Whether the one study or the other be pursued, the same framework furnishes the limits or directions of investigation. For both, the universe is little more than a crass substance operated on, from a distance, by some Being whose essence and ways are inscrutable, because known to us only in physical consequences. The dualistic attitude determines everything. For God exists by himself somewhere off in the clouds, and the universe, scattered through space, speeds on its way in isolation from him, except for the abnormal interferences. The Deity may be a magnified mason, or clockmaker, or optician; or, on a slightly higher level, "a necessary Being,"—one existence among the planetary spheres, invisible as compared with them, no doubt, but external to all, and therefore another piece on the cosmic chessboard. In the same manner, and as a logical accompaniment of this doctrine, the human soul may be defined as "a simple, incorporeal substance"—a substance utterly irrational, so far as experience can throw light upon it, nevertheless, like Deity, taking its place among other substances. It may be classed as an extra part of the universe, even if it cannot be demonstrated by inspection of the parts. On this basis, the books of the mind could be kept by double entry, and thus the central problem could be dismissed, or, as the fact was, slurred altogether. On such terms Philosophy of Religion simply could not exist; no demand for it was possible.

Now, we must never forget that this general condition held

dominion over the English-speaking folk till well on in the nineteenth century. Nothing else is contemplated, for example, even in the third edition of Whewell's *History of the Inductive Sciences* so late as 1857. Furthermore, with fine genius for compromise, one of its main marks and one that accounts for much of its political success, the English mind has long been, and still is, engaged in attempts to tinker this very system under the influence of the organic idea of the universe, the principal contribution of the nineteenth century to progress in thought. Nay, so deep has the view become that men have been found to foster it several generations after it had been discreetly buried, say, in Germany. And on this interesting situation it may be worth while to bestow some attention.

The endowments alluded to above are three in number: (1) the Burnett; (2) the Bridgewater; (3) the Gifford. As the first and second are matters of history to-day, we may dismiss them briefly. The third demands more serious attention, not only on account of its present prominence and results, but also for the personality of its founder.

1. John Burnett was a merchant, of Aberdeen, Scotland, who lived from 1729 to 1784. His interest in things religious is evinced by the fact that he absented himself from public worship,—a much more notable proceeding then than now, fearing that he might become committed to the creed of some church. The mere circumstance points to a real religious interest. The Bequest was made in 1784. In the Preface to his *Theism; the Witness of Reason and Nature to an All-wise and Beneficent Creator* (1855), the late Principal Tulloch, of St. Andrews University, wrote as follows: "The circumstances in which this Essay originated are probably familiar to many. It has been thought proper, however, briefly to state them here. Mr. Burnett, a merchant in Aberdeen, whose character appears to have been marked by a rare degree of Christian sensibility and benevolence, amongst other acts of liberality, bequeathed certain sums, to be expended at intervals of forty years, in the shape of two Premiums, inviting to the discussion of the evidences of religious truth, and especially to the consideration and confirmation of the attributes of Divine Wisdom and Goodness. . . . On the

previous occasion of competition, the first of the Premiums was awarded to the late Principal Brown of Aberdeen, and the second to the Rev. John Bird Summer, Fellow of Eton College, and now Archbishop of Canterbury. On this occasion, the First Premium of £1800 has been adjudged to the Rev. R. A. Thompson, M. A., Lincolnshire; and the second, of £600, to the present writer." The subject of investigation, as laid down by the founder, was as follows: "The evidence that there is a Being, all-powerful, wise, and good, by whom everything exists; and particularly to obviate difficulties regarding the wisdom and goodness of the Deity; and this, in the first place, from considerations independent of written Revelation; and, in the second place, from the Revelation of the Lord Jesus; and, from the whole, to point out the inferences most necessary for, and useful to, mankind." All things considered, then, this foundation was on the orthodox side, though with no undue rigidity. And it was made when Hume's philosophy happened to be causing some searching of heart in Scotland. The first award, mentioned as above by Tulloch, took place in 1815; the second in 1855. Since 1855 the funds have been applied by the University of Aberdeen to the provision of a lectureship in some branch of archæology, or science, or history, so treated as to illustrate Natural Theology. While the early Essays on the foundation show small sense for anything beyond the old deistic purview, it is interesting to note that the epoch-making lectures of Robertson Smith, on the "Religion of the Semites," were given on the Burnett Fund; they serve to illustrate how far we have travelled from the Founder's intention. I understand that the greater part of the fund is now to be appropriated to the institution of a professorship of History in Aberdeen University.

2. By a will, dated 25th February, 1825, the Rev. Francis Henry, eighth Earl of Bridgewater, left a sum of £8000, to be given, by the President of the Royal Society (London) to such persons as he might select to write and publish treatises "On the Power, Wisdom, and Goodness of God as manifested in the Creation." The Earl died in 1829, and the then President of the Society divided the funds into eight portions, of £1000 each, with

the result that the last great series of works in English, on Natural Theology, was produced as follows: *The Adaptation of External Nature to the Moral and Intellectual Condition of Man*, by Thomas Chalmers; *The Adaptation of External Nature to the Physical Conditions of Man*, by John Kidd; *Astronomy and General Physics considered with reference to Natural Theology*, by William Whewell; *The Hand, its Mechanism and Vital Endowments as evincing Design*, by Sir Charles Bell; *Animal and Vegetable Physiology considered with reference to Natural Theology*, by Peter Mark Roget; *Geology and Mineralogy considered with reference to Natural Theology*, by William Buckland; *The Habits and Instincts of Animals with reference to Natural Theology*, by William Kirby; *Chemistry, Meteorology, and the Function of Digestion considered with reference to Natural Theology*, by William Prout. The character of these books (which can be bought *en bloc* to-day for a few shillings) is well brought out by Professor Caldecott, in the most recent contribution to the history of religious thought in England. Chalmers "had no time for the study of German Idealism; the Traditional Theism was out of accord with the Sciences as he read them and with the Scientific men with whom he came into contact; Induction offered itself as a Method, in the form of Teleology applied to contrivance and adaptation. We have seen how weak was his confidence in the result when he came to look at it after his case was stated. As a practical man it did not really concern him very much; he nearly escapes into Ethical Theism more than once; and Revelation was at hand to supply sufficient basis if Natural Theology should wholly fail."[1] This, when the entire movement involved in the work of Herder and Kant, Goethe and Hegel was a commonplace in Germany! Small wonder that Hegel rubbed his eyes when he looked across to England, and referred, with his customary sardonic humor, to the Philosophy of Hairdressing.

3. On a previous occasion,[2] I had the opportunity of calling attention to the circumstances of the foundation of the Gifford Lec-

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[1] *Philosophy of Religion in England and America*, p. 135.

[2] *The Open Court*, Vol. XIII. (February, 1899), pp. 72 ff.

tureships at the four Scottish universities, and noticing some of the consequences. It is unnecessary, therefore, to repeat the details now. Suffice it to say that Adam Gifford (1820–1887), a judge of the Scottish Supreme Court (Senator of the College of Justice is the Scottish title), devised the sum of £80,000 to the four universities for the purpose of founding lectureships on what he termed Natural Theology. Since I wrote the article for *The Open Court*, I have come into possession of certain of Gifford's writings, —privately published; and I have permission to make use of them. They are of importance as showing how the Founder himself felt vaguely that Natural Theology had passed away, although he did not seem to comprehend why. His experience, then, may be of service in casting a fresh ray upon the curious backwardness of the English-speaking mind in this matter.

To begin with, his testamentary directions stand in strong contrast to the somewhat limited provisions of Burnett and Bridgewater. In part, they read as follows:

"I having been for many years deeply and firmly convinced that the true knowledge of God, that is, of the Being, Nature and Attributes of the Infinite, of the All, of the First and the Only Cause, that is, the One and Only Substance and Being, and the true and felt knowledge (not mere nominal knowledge) of the relations of man and of the universe to Him, and of the true foundations of all ethics and morals, being, I say, convinced that this knowledge, when really felt and acted on, is the means of man's highest well-being, and the security of his upward progress, I have resolved . . . to institute and found, in connexion, if possible, with the Scottish universities, lectureships or classes . . . for promoting, advancing, teaching, and diffusing the study of natural theology, in the widest sense of that term, in other words, the knowledge of God, the Infinite, the All, the First and Only Cause, the One and the Sole Substance, the Sole Being, the Sole Reality, and the Sole Existence, the knowledge of His nature and attributes, the knowledge of the relations which men and the whole universe bear to Him, the knowledge of the nature and foundation of ethics and morals, and of all obligations and duties thence arising. . . . No person shall hold the office of lecturer in the same city for more than six years in all, it being desirable that the subject be promoted and illustrated by different minds. The lecturers appointed shall be subjected to no test of any kind, and shall not be required to take any oath, or to emit or subscribe any declaration of belief, or to make any promise of any kind; they may be of any denomination whatever, or of no denomination at all (and many earnest and high-minded men prefer to belong to no ecclesiastical denomination); they may be of

any religion or way of thinking, or as is sometimes said, they may be of no religion, or they may be so-called sceptics, or agnostics, or freethinkers, provided only that the patrons will use diligence to secure that they be able, reverent men, true thinkers, sincere lovers of and earnest inquirers after truth. I wish the lecturers to treat their subject as a strictly natural science, the greatest of all possible sciences, indeed, in one sense, the only science, that of Infinite Being, without reference to or reliance upon any supposed special, exceptional or so-called miraculous revelation. I wish it considered just as astronomy or chemistry is. I have intentionally indicated, in describing the subject of the lectures, the general aspect which personally I should expect the lecturers to bear, but the lecturers shall be under no restraint whatever in their treatment of their themes; for example, they may freely discuss (and it may be well to do so) all questions about man's conception of God or the Infinite, their origin, nature, and truth, whether he can have any such conceptions, whether God is under any or what limitations, and so on, as I am persuaded that nothing but good can result from free discussion. . . . And my desire and hope is that these lectureships and lectures may promote and advance among all classes of the community the true knowledge of Him Who is, and there is none and nothing besides Him, in Whom we live and move and have our being, and in Whom all things consist, and of man's real relationship to Him Whom truly to know is life everlasting."

The external incidents in the life of the strong, noble, and kindly author of this remarkable document are not numerous. Born in 1820, the son of an Edinburgh merchant, he was brought up as most boys belonging to his social class were at that time. Religious influences must have been strong in his early days, for his father belonged to the straitest sect of Scottish religionists, and Gifford himself taught in Sunday school. Yet although nurtured thus, he did not come of a bigoted stock. It has been said significantly of the father, "His reading and thinking led him into regions beyond those in which most men live and move, and a certain far-sighted wisdom, touched with poetry and idealism, characterised his opinions. As a consequence, these were often in advance of his time; and his children have lived to see some ideas of his, which were regarded as Utopian when he uttered them, secure a place in men's common thoughts." Gifford's mother, too, was a woman "not much taken up with the externals of life, but deeply impressed with its spiritual realities." The home environment, therefore, was calculated happily to impress the youth with the

importance of religious questions, but these were not presented in that gloomy or canting fashion which so often throws young zeal into a scoffing mood later on. In brief, Gifford had just that kind of home influence to which many of the most remarkable Scots of the time have traced much of what was best and most tenacious in them and in the causes for their success in life. As a boy he was dubbed "the philosopher" by his playmates, a name he earned from his marked habit of reading and thinking. At fifteen he apprenticed himself to an Edinburgh solicitor, and, as so many Scots lawyers' clerks still do, attended classes at the university. During this period he was an omnivorous reader, and taught Sabbath-school. In 1849 he quitted the solicitor's business, and became a member of the Scottish bar, which was to provide him with his life-work. An advanced Liberal in politics—which in Scotland implies nothing as concerns theological views—he appears to have taken no prominent lead in party affairs, and received no recognition of importance from Government till 1865, when he obtained appointment as Sheriff-Principal. In 1870, to the surprise of his friends, he was raised to the Scottish Bench; in 1881, paralysis, which had threatened him for a decade, disabled him completely, and he retired into private life, devoting his last years to the study of philosophy and theology, subjects in which he was already expert. Some of his sayings at this crisis shed light on the problems uppermost in his mind. "I have often wished for leisure to read and to think, now I have it." "I think I have seen more clearly many things about God since I have been laid aside." "To be happier or wiser, that just means to have *more of God.*" Although he was among the greatest advocates of his day, and earned his large fortune by his own talents exclusively, it has been said "that his heart never was entirely with his profession. With the technicalities and verbalism of law he had no sympathy, nor with the petty squabbles of men, to decide which he was obliged to give his close attention. The only region of law in which he could freely breathe was that in which are found the principles of true and unchanging justice. He was an equity lawyer, and in any case where he could apply these principles, he swept precedent and word-

splitting aside, and fearlessly did the right. . . . He sought higher subjects of thought and higher enjoyments. . . . He read much, and read on every subject. . . . He read with his mind fully awake, and, as he marked each book he read, so every memorable thing was marked in his mind. While he read the records of the mighty thinkers of olden times in Latin, French, or German, and knew something of most of them in science and philosophy, he was fully abreast with the most recent thought. . . . His mind became more and more absorbed in philosophy and theology, or rather philosophic theology. He had all his faculties during the first years of his illness, and he had ample leisure to employ them. They were largely engaged in the highest and most difficult problems of God's nature and man's relation to Him. He studied and admired Spinoza, yet always denied that he himself was a Pantheist, marking the distinction thus: 'Spinoza holds that everything is God. I hold that God is everything; if I were to assume a name descriptive of my belief, I should be called a Theopanist.' . . . He sided with Bishop Berkeley in the doctrine of the superior evidence for the existence of mind compared with what we have for the existence of matter, and had no sympathy with materialism. He seemed sometimes to wish he had strength to contribute his thoughts, to counteract the prevailing materialistic philosophy of our day. . . . The Bible he knew well and studied much, though he did not hold the doctrine of verbal inspiration. . . . The Gospel of John was more in harmony with his mind than the Pauline writings. . . . His favorite definition of the creature was 'a part of the Infinite,' for, he said, 'the Infinite cannot be infinite if it does not include everything.' He treated man's consciousness of personality and the testimony of his intuitions with little reverence, holding God and God's infinite existence as all and in all, overlooking that our knowledge of God, however imperfect, can only rest on our knowledge of ourselves."

In the case of a thinker like Gifford, who has left nothing whereby formal conclusions can be estimated or even guessed, the course of whose personal thought remained a matter so private that no account of it is forthcoming from those who knew him best, one

cannot expect to arrive at conventional or systematised results. In any case, however, this is clear; he had travelled far from the atmosphere breathed by the natural theologians and their opponents, and he tended to think in categories to which British thought had been a stranger since the far-off days of the Cambridge Platonists. It becomes necessary, therefore, to notice the direction taken by European speculation after the bankruptcy of eighteenth century philosophy. Having done this, it will be possible to arrive at a less indefinite view of the tendencies implied in the theme taken to heart so deeply by Gifford.

The British mind remained unconscious of the organic and historical standpoint throughout the first sixty years of the nineteenth century. And the same may be said of systematic thinking in the United States. Of course, one does not forget Coleridge and Carlyle and Emerson and the Tractarian Movement. But these hardly belong to the circle of scientific investigation. On the whole, Paley manages to remain representative, as the *Bridgewater Treatises* show; and he knew nothing of Kant, of the German Romantic writers, or, still more wonderful, of Hume's *Natural History of Religion* (1757), not even of the posthumous *Dialogues*, published twenty-three years prior to the *Natural Theology*. While, as was to be expected, Spinoza passed over his head completely. Turning to Germany, a very different situation bursts upon one. The second half of the eighteenth century was marked by a curious, almost paradoxical, movement, as Prof. Kuno Francke has shown so well. Contrasted with the traditional individualism of England, we find the rise and spread of a "social sense," which expresses itself in an individualistic fashion by making personal culture the ideal of life. "Whatever there was progressive in German thought tended, on the one hand, toward a disintegration of the collective forces of an outworn society; on the other, toward the unfolding of isolated independent individuals, the germ-bearers of a new social order."[1] But these individuals develop themselves under the inspiration of a fresh, vitalising idea. This may be char-

[1] Kuno Francke. *Social Forces in German Literature*, p. 265.

acterised as the reorientation of the individual by reference to the universal elements which bestow significance and greatness. It can be traced as early as 1755 in Winckelmann's *Gedanken*, then in Lessing's *Nathan* (1766), and *Education of the Human Race* (1780), and in Herder's *Fragmente* (1767), even although, in these works, it is struggling as yet with the static conceptions peculiar to the kind of thought associated mainly with the eighteenth century. Nevertheless, despite this pervading contemporary influence, a few brief years serve for its emancipation, with Herder, even if he cannot be said to hold an even balance or to be certain of himself always. His most notable work, *Ideen zur Philosophie der Geschichte der Menschheit* (1784–1789), as Julius Schmidt has noted rightly, takes its place beside Kant's *Kritik der reinen Vernunft* as embodying the significant tendencies of the age. Nor is this all. Kant's star was destined to wane for two generations, while Herder's suggestions, albeit with little recognition of the part he had played, were to acquire ascendancy. In short, his central ideas—the conception of development, and the organic view of the universe—were to become very familiar, thanks to poets, humanists, and metaphysicians, long ere the positive sciences evinced recognition of their vast importance. Herder "represented the whole history of mankind as a succession of national organisms; each revolving round its own axis; each living out its own spirit; each creating individual forms of language, religion, society, literature, art; and each by this very individualisation of national types helping to enrich and develop the human type as a whole."[1] Here are the prophetic utterances, in which he lays the foundation, not only for Philosophy of Religion, but for all the new historical sciences, for modern philology in its widest sense; "History leads us, as it were, into the council of fate, teaches us the eternal laws of human nature, and assigns to us our own place in that great organism in which reason and goodness have to struggle, to be sure, with chaotic forces, but always, according to their very nature, must create order and go forward on the path of victory."[2] Thus the artificial

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[1] Kuno Francke. *Ibid.*, p. 325. [2] *Ideen*, Book XV., 5.

distinctions of previous thought are to put to flight. The dualisms between matter and mind, between understanding and reason, between nature and God, between natural and revealed theology, solve themselves, thanks to the discovery of a principle that points toward a higher unity, presupposed by these very distinctions, and rendering them possible.

Once more, if much is to be learned from the positive teaching of Herder, his opposition to Kant, almost intuitive, is hardly less significant. A certain lack of humor, often traceable to the distorted perspective that pertains to propinquity, prevented him from perceiving the real situation as it appeared, for example, to such a writer as Heine. Whatever its defects on the side of technical scholarship, Heine's brilliant insight reveals, in large measure, the cause of Herder's restlessness. "I refrain from all popular discussion of Kant's argument in disproof of the ontological evidence for the existence of God. Let it suffice to give an assurance that since Kant's time deism has vanished from the realm of speculative reason. It may perhaps be several centuries yet before this melancholy notice of decease gets bruited abroad universally; we Germans, however, have long since put on mourning. *De Profundis!* You fancy, then, we may go home now. On my life, no! there is yet a piece to be played; after the tragedy comes the farce. To this point Immanuel Kant has pursued the path of inexorable philosophy. He has stormed heaven, and put the garrison to the edge of the sword; the ontological, cosmological, and physico-theological body-guards lie there lifeless; Deity itself, deprived of all demonstration, has succumbed; there is now no all-mercifulness, no fatherly kindness, no other-world reward for renunciation in this world, the immortality of the soul lies in its last agonies,—you can hear its groans and death-rattle; and old Lampe is standing by with his umbrella under his arm, an afflicted spectator of the scene, tears and sweat-drops of terror dropping from his countenance. Then Immanuel Kant relents, and shows that he is not merely a great philosopher but also a good man; he reflects, and half good-naturedly, half-ironically he says: 'Old Lampe must have a God, otherwise the poor fellow can never be happy. Now, man ought

to be happy in this world; practical reason says so;—well, I am quite willing that practical reason should also guarantee the existence of God.' As the result of this argument Kant distinguishes between the *theoretical* reason and the *practical* reason, and by means of the latter, as with a magician's wand, he revivifies deism, which theoretical reason had killed." Between old and new, the age was not yet sure of itself. A constructive Philosophy of Religion was necessary to replace the old Natural Theology, but, for all his originality, Herder could not furnish it. He assembled not a few of the most formative ideas, but it was decreed that he should not complete the structure. From the welter of Kant and anti-Kant, of *Sturm und Drang* and Romantic aspiration, of Fichtean earnestness and Schelling's fertile changes of front, Hegel came at length to put an end to bewilderment by building the essential elements into a single grand scheme. With him the first act in the drama of nineteenth century thought closed.

An exposition or appreciation of the Hegelian system would occupy much time, might trench upon eternity, possibly, and this is not the place for it. But circumstances demand that we try to see, very briefly, what Hegel accomplished. His Philosophy of Religion happens to be one among several applications of his central principle. Like its fellows, it consists in an evolution of an involution. The universe as known in human experience—and there can be no other—presents itself for explanation as a self-developing whole. In the process of its self-manifestation, it passes from stage to stage. That is to say, an immanent principle binds everything together, and appreciation of the details at any chosen point depends entirely upon a due apprehension of the places they occupy in the universal phases of this principle as it expands its inwardness. Moreover, this synthetic and controlling power cannot be alien from human thought; nay, the two are one; for human reason is reason just in proportion as it reveals the significance of the cosmic unity, of which it is part and parcel. Accordingly, religion cannot be fenced off from ordinary life and relegated to some consecrated enclosure of its own. Further, as it is one of the most characteristic or self-explanatory parts of human experi-

ence, we must expect to find it giving meaningful glimpses of the inner unity. Therefore, Philosophy of Religion consists in the effort to separate the permanent from the contingent, to lay firm hold upon the immanent principle of union amid the puzzling alterations incident to manifold particular changes. Thus, philosophy and religion are one, because both seek the same object, the same eternal truth. As a result of this insight, Hegel was the first to perceive that Philosophy of Religion must execute a double task. First, on the systematic side, it ought to show what Religion is, to point out the elements involved, not, however, by way of a barren analysis, but by an intimate presentation of the formative moments always traceable in its vital manifestation. Secondly, it ought to trace these moments, in their greater or lesser fullness, as they can be seen in the history of religions. In a word, the systematic and historical inquiries are complementary and indivisible. As contrasted with the old Natural Theology, we have here a synthetic, comparative and historical method; as opposed to dualism and deism, we have idealistic monism and panentheism.

Every one knows that, since 1860, this point of view has entered into and modified profoundly the thought of the English-speaking peoples. Prior to this date, there was a long period of preparation, when seers, like Coleridge and De Quincy and Carlyle and Emerson prophesied in the wilderness. Gifford's life lay chiefly in this period, but he had previsions of what was to come. What did come, as we now begin to see, may be stated somewhat as follows. The higher or historical criticism of the Old and New Testaments impinged upon the English mind at the time when Darwin's epoch-making work burst upon the world. And, as if this were not enough, the blast of German idealism swept through our universities during the same period. So, all the old, familiar landmarks appeared to be going by the board at once. Probably the average man could have endured the contumely heaped on Locke and Reid and Hamilton, and on the fathers of New England metaphysicising. He takes no very vivid interest in such things and, above all, is slow to see what the criticism implies concerning his cherished creed. Free-will and conscience and common sense and

natural rights may be consigned to the lumber-room of tradition without arousing his suspicions too deeply. But if, in addition, the Bible be arraigned at the same bar as the Vedas, the Iliad, the Qu'uran, the Divine Comedy, and the Elizabethan Drama; and if man be reduced from his centric position—as the person for whom the universe and the "plan of salvation" exist—and be relegated to his place among the other animals, the import of the philosophical movement becomes much plainer, and the effect of philosophy, historical criticism, and science in combination possesses strength sufficient to shake the strongest nerve, to arouse the most indifferent. Dismiss Reid and Mansel and McCosh for pifflers, and no great harm is done. But hint that "Jonah" contains an allegory, that the Hebrews found a new Baal at Horeb, that no one knows who wrote the "Gospel of John"; suggest that the human mind and "soul," like the human body, can be explained by natural causes,—and forthwith alarm rings out over the land. Let all these conclusions rain problems at once, and panic is apt to ensue. Nevertheless, panic or no panic, the English mind required the medicine that Time had in store. But it took the dose in its own fashion—with a large infusion of compromise. As a consequence, Hegelian influences stand to a great extent for a temporising rather than a radical movement. Here and there a book like the late Dr. William Mackintosh's *Natural History of the Christian Religion* has seen the light, but only to fall from the press still-born. On the other hand, Professor Otto Pfleiderer's *Gifford Lectures* produced a storm which, whatever may be said of it otherwise, was vastly interesting, because several of his opponents had themselves imbibed deeply of the doctrines he favored, and all of them must have known that he was retailing Teutonic commonplaces. Thus, in the main, such Philosophy of Religion as Britain and the United States have had has avoided fundamental problems, and has striven to patch up a working universe out of the fragments left from mediævalism and Natural Theology, *plus* plan and embellishment from the Herder-Hegel synthesis. Similarly, on the scientific side, the intellectual history of Romanes—beginning in Paleyan orthodoxy, passing to materialism, thence to something like hylozoism, and

ending at length in Anglican mysticism—may be taken as symptomatic, if not exactly typical. To be brief, the reaction upon the interposition of Hegel has not led beyond Hegel. So, just as German industry has spent the seventy years since his death in accumulating masses of new facts, many of them filled with the promise of new problems, awakened speculation among the English-speaking peoples has been familiarising them with a point of view whose adoption seemed to demand too great a price. The Gifford Foundation is well calculated, not only to continue this work, but to lead beyond it.

Returning now to Gifford himself; it is no disadvantage that, like so many of his compatriots (Hobbes, Locke, Berkeley, Hume, the Mills, Mr. Spencer), he did not attack philosophico-theological questions as a professional. On the contrary, even if his remains be meagre, we can see the man working freely in his own way. The excerpt from the Deed, and the other quotations given above, prove that he was dissatisfied with the traditional dualism and individualism of the British mind in its attitude towards ultimate problems. They prove also that he had not shaken himself clear completely from these limitations. For example, he cannot endure a God separated from the universe, he is, as he says, a "Theopanist." At the same time, he often writes as if this separation were a fact, and from some of his lectures further significant insights can be gleaned as to the transitional stage in which he lived. These "Lectures," it may be added, were published privately after his death. The following are their titles and dates. (1) *Ralph Waldo Emerson* (1872); (2) *Attention as an Instrument of Self-Culture* (1874); (3) *Saint Bernard of Clairvaux* (1875); (4) *Substance, a Metaphysical Thought* (1878); (5) *Law a Schoolmaster; or, the Educational Function of Jurisprudence* (1878); (6) *The Ten Avatars of Vishnu* (1880); (7) *The Two Fountains of Jurisprudence* (1880). To begin with, it is evident throughout that Gifford had detached himself from the traditional ways of English thinking to a considerable extent. Those declarations are significant enough. "The truth is, that although in education and elsewhere we may try to separate secular from sacred, and provide time-tables and conscience clauses

and so on, religion will not be separated from anything whatever! It will penetrate every cranny and pervade every space, and it will flow around and through every subject and every substance like electricity. You cannot produce and you cannot maintain a religious vacuum, and if you could, even secularism would die in it." Again, referring to the portents that heralded St. Bernard's birth, he writes: "Omens of this kind, and in cases like that of Saint Bernard, are probably very often invented after the event, and after the foretold greatness has been actually attained. In other cases perhaps they tend to produce their own fulfilment, and stimulate the genius or the exertions of him who believes himself heralded from on high. In any view, the belief in such omens, wide and universal as it has been, is an interesting fact in the history of humanity during the *ages of faith.*" We do not expect a Scot, even now, to be tender toward the Roman Church, but Gifford gives us the following: "The Church was the last bulwark of humanity in the Dark Ages. She kept in awe the rude barons and the barbarous kings, and took the poor and forsaken to her bosom. To the everlasting praise of the Catholic Church be it said, she never knew any difference between rich and poor, between the nobly born and the lowly born, but welcomed all alike to her loving, though somewhat rigid, arms. . . . With all her failings, the Church was almost always on the side of justice and mercy and humanity." Speaking of the subject of miracles, he points out that "it is closely connected with the modern phenomena of mesmerism, of catalepsy, of spiritualism, and of trance." And on the cognate subject of the human soul, he says: "The human soul is neither self-derived nor self-subsisting. It did not make itself. It cannot exist alone. It is but a manifestation, a phenomenon." Writing on the legend of the First Avatar of Vishnu, he shows his acquaintance and agreement with the modern historical standpoint. "The affinity of this legend with the Mosaic account of the Deluge is too obvious to need notice, and the contrasts are also remarkable. Both probably came from the same source, but the best authorities hold that there is no reason to think that the one was borrowed or adapted from the other. There are traces and traditions of a deluge in all early

religions, and perhaps it is not impossible that some of them may have originated in dim and imperfect readings of misunderstood geologic facts. Shells are found embedded in the strata even on the tops of lofty mountains, impressions of fish are disclosed almost by every hammerstroke in the limestone cliffs, and nothing is more natural than the suggestion, (indeed nothing is more true), that the sea has once been there. It is only a hasty and hurried guess that the sea came there by a miraculous deluge, instead of in the orderly revolutions of untold millenniums." In an address to a Young Men's Christian Association, delivered twenty-three years ago, we find this statement, not noticeable now, but "advanced" then, especially when we remember its environment—the most ecclesiastical of Scottish cities. "Let me also ask you, as an humble but thorough-going disciple of science, to take nothing on my word, nothing on my authority, or on the authority of any other man. Science knows no authority but the intuition of truth. Search for yourselves, and see if we have not been speaking the words of truth and soberness. A Young Men's Christian Association should above all things be *free*. Free in the noblest and highest sense. The truth—fear it not in any guise—the truth shall make you free."

Similarly, one can detect here and there how Gifford had moved far from the individualistic standpoint of his folk and early youth, with its fixed distinctions. "To try to fix, to define, and to enforce a man's duty to himself alone, and apart altogether from the interests and the rights of his fellows, would be to ignore and to destroy that equal and inalienable right which I have already claimed for every man to use and to enjoy to the fullest all his faculties, provided only he leaves entire and untouched the very same equal use and equal enjoyment to every other. His rights can only be limited by the equal rights of his neighbor—using that word neighbor in its widest sense as including all men and their descendants." Once more, "Moral truth, like every other kind of truth, is unchangeably and eternally the same. It is founded in the nature of *things*, as it is called,—that is, in the nature of God. But moral *science*,—that is, man's knowledge, man's *scientia* of morality,—is constantly varying, now advancing, now receding; and moral sci-

ence, like every other science, is essentially progressive, and capable of indefinite advancement. . . . And so morality is not a fixed, but a growing science; and it is not an independent, but a dependent and superadded science! It is superior to, and yet dependent upon, all the discoveries of intellect, and of science, of history and of metaphysics." To the same effect is the following, which serves to illustrate how Gifford had broken the bonds of a provincial sectarianism. "In Hinduism will be found spiritualism the most refined for the spiritualist, and materialism the grossest for the modern atomist. . . . To the philosophic monotheist is presented an ideal of deity too lofty for expression, dimly indicated as the unthinkable and the forever unknown; while to the idolator is thrown open the vastest pantheon, crowded and populous with Superstition's nameless and innumerable brood. The ritualist and the devotee may find ceremonies and penances which would consume a thousand lives, while the holy and the devout may spend unconscious centuries in the ecstasies of absorption. . . . In primary or original theology, in speculative theism, and in the grand doctrine of the Immanence of God, I think that Buddhism is far inferior to Brahmanism, but it is greatly superior in its moral teaching, and indeed the wonder is that moral teaching so high should be rested on a system which it is difficult to defend from the charge of being atheistic. . . . Truly, Hinduism may claim to be a *catholic* religion." Finally, in his lecture introductory to the first Course of Gifford Lectures delivered before the University of Glasgow, the late Max Müller, who seems to have taken trouble to inform himself on the subject, declares: "There can be no doubt that he [Gifford] deliberately rejected all miracles, whether as a judge, on account of want of evidence, or as a Christian, because they seemed to him in open conflict with the exalted spirit of Christ's own teaching. Yet he remained always a truly devout Christian, trusting more in the great miracle of Christ's life and teaching on earth than in the small miracles ascribed to him by many of his followers." [1]

When we inquire, Did Gifford arrive at any definite first prin-

[1] *Natural Religion*, p. 3 (first edition).

ciples? the answer must be, unfortunately, that nothing extant affords a basis broad enough for judgment. Nevertheless, two Lectures—those on "Emerson" and on "Substance"—offer materials which it is impossible to overlook. From them one may infer that the writer was not only detached from the traditional thought of his country, but was in the habit of formulating something positive for himself. On the whole, these constructive insights belong to the period of preparation, when Natural Theology still held sway and when Philosophy of Religion lay in the future; the period anterior to the rise of Scottish Hegelianism, a time when Emerson and Carlyle prophesied, and when the later leaders, like John Caird, Thomas Hill Green, and William Wallace, were still young. Tendencies attract notice rather than achievements; vision, not *Wissenschaft*, determines speculation; personality carries the day more than principle consciously reasoned out. "The truths of nature," in Gifford's language, "are the ever fresh thoughts of God." The admiration of Emerson is symptomatic in itself. "Twenty-five years ago I heard Mr. Emerson deliver four lectures in Edinburgh. . . . I listened to him with a youthful and overflowing enthusiasm. That enthusiasm I *still feel.*" In the same way, much may be inferred from passages such as these: "Mystery and obscurity are as essentially parts of nature as clearness and definition. It is a great mistake to suppose it the only test of genius to be always clear and distinct and lucid. It is only very narrow genius that is always that. The great man, like the great painter, is great both in light and in shadow. Nature lives in both, and is in perfect *chiaro-oscuro*. . . . In truth, he who does not find mystery and darkness everywhere may rest assured that he has seen nothing as he ought to see it. . . . This cannot be said of Emerson. If he sees the light he is still more conscious of the darkness, and is drawn to it with a strange fascination. . . . Not only is he really a lover of mystery, but he is also *mystical*, that is, he is fond of embodying the unknown, the dimly seen, or the darkly guessed at, in fanciful forms and emblems."

"Line in nature is not found;
Unit and universe are round;

In vain produced, all rays return;
Evil will bless, and ice will burn."

"I gather also that he rather inclines to the higher or subjective pantheism; but he will not limit and he cannot define. Before all such questions he stands uncovered and reverently silent. . . . Is one who occupies this position to be blamed? The thoughtful and magnanimous will not say so. I cannot condemn that wise and humble scepticism, which, while reverently waiting and inquiring, refuses to say what it does not think, or to profess a belief which it does not feel. Let us all be patient and wait."

Notwithstanding this mystical mood, Gifford felt the need for system, or, at least, for reconstruction. Of this the lecture on *Substance* affords ample evidence. "I take the opportunity of saying to you,—Young men, keenly desirous of mental and moral elevation,—Don't neglect Metaphysics! The Science of Mind, and the doctrine of the Unseen and the Universal!" At one point, he almost succeeds in wrenching himself free completely from the dualistic implications with which his intellectual environment was saturated. "If I had time and opportunity, I think I could demonstrate, that in the deepest and last analysis the conception of *substance* is identical with that of *cause*, and that on this conception —a conception, it may be, with a double aspect, substantial and causal—there rests not only the whole structure of philosophy, but the very possibility of religion and piety. So that without the doctrine, the true doctrine, of substance and of cause, philosophy would be a delusion and religion a dream. Just let me say in passing, and I say it with the deep seriousness of profound conviction, that true philosophy and true religion must stand or fall together. If philosophy be a delusion, religion can hardly escape being shown to be a dream. Perhaps as we go on with our consideration of *Substance*, we shall begin to see how truly it is the very foundation-stone." In the following, again, we have a basis for constructive idealism; even if the statement be made as an assumption, it is one which the author evidently believes with the whole force of his strenuous nature. "The substance and essence of a man is his *reasonable* and *intelligent* soul. This is the cause and explanation

of all the phenomena which man presents. . . . The force behind and in all forces, the energy of all energies, the explanation of all explanations, the cause of all causes and of all effects, the soul that is within and below and behind each soul, the mind that inspires and animates and thinks in each mind, in one word the substance of all substances, the substance of all forms, of all phenomena, of all manifestations, is God." Notice, too, the influence of Spinoza, and the conscious recognition of affinity for him. "If God be the *substance* of all forces and powers and of all beings, then He must be the *only substance*, the only substance in the universe or in all possible universes. This is the grand truth on which the system of Spinoza is founded, his whole works are simply drawing deductions therefrom. . . . If this be only one chapter of metaphysics, these metaphysics can be no empty and barren science, but must be fraught with results and lessons as momentous as they are divine."

On the other hand, the tentative character of all the conclusions may be gathered from the unguarded manner in which they are expressed so frequently. "Man generally worships the Phenomenon, the Appearance, the Revelation. But the Noumenon, the Real, the Substance revealed, is withdrawn from his faculties." The same thought, implying a separation between substance and phenomenon, or the possibility that the latter may hide—and so cannot *be*—the former, appears often in the essay on *Substance*. Elsewhere, Gifford approaches more closely to what we hold for true now, as, for instance, when he says: "To understand iron, to get at its substance, we must look to the forces and to the motions, or to both, of its molecules or of its ultimate atoms." Yet, on the whole, the insinuating fallacy of a possible division between substance and its "forms" is never put to utter rout. It could not be at that time; and this is precisely the reason why Gifford endowed Natural Theology, not Philosophy of Religion. The latter was just about to oust its predecessor for ever; yet the dualistic reference, current everywhere in the English-speaking countries twenty-five years ago, and dominant now in many a mind, preserved the ancient nomenclature, but, thanks to Gifford's own experiences,

not the ancient limitations. The broad sweep of a great spirit, overwhelming all artificial bounds, informs the Deed of Foundation of the Lectureships. And, recognising this, the beneficiaries have gone beyond Natural Theology with wonderful unanimity, and have accomplished much to spread abroad the light of that fuller day which the Founder divined but did not live to witness.

No doubt, Gifford's ethical catholicity and largeness of mind were moulded by his wide information in history and poetry, just as his eminence in legal oratory, like the warm brilliance of his style, flowed from his earnest spirit. These passages, prophetic of the complete victory of the historical method, with its enormous stride towards a true "Theopanism," serve at once to justify the transformation of Natural Theology into Science and Philosophy of Religion, undertaken by past lecturers, and to reveal further the manner of man to whom these splendid benefactions constitute a monument so fitting. "The Middle Ages! What strange scenes and pictures do not the words recall? The fortalice of the half savage Baron and the mean huts of his degraded serfs. The proud pomp and spiritual power of the haughty churchman, before which the strength of kings, and the might of feudalism was fain to kneel. The chivalry of Europe drained time after time to furnish forth the armies of the Crusaders. Religious excitements and revivals passing like prairie fires over Europe, and compared with which modern revivals, even the wildest, seem but the coldest marsh gleams. Strange and terrible diseases and epidemics, and plagues both bodily and mental, that mowed down millions as with the scythe of destruction. The spotted plague, and the black death, and the sweating sickness. The dancing mania, the barking mania. The werewolf and the ghoul. Strange mystical schools of Philosophy exciting popular admiration and enthusiasm to us unexampled and inexplicable. And below all, the swelling and the heaving of the slow but advancing tide which even yet is bearing us upon its crest. . . . Even Saint Bernard's tomb has been swept away, and the site of the once famous monastery is now occupied by a district prison. But the work of Saint Bernard still tells upon humanity. He made his mark upon the ages as they passed over his grave,

and the Church long bore the impress of his gigantic spirit. . . . Bernard's asceticism and austerities were not so to speak mere selfish acts, ending on himself as secluded from the world. They were not the mere formalities of the solitary and almost mindless hermit, muttering and moping in semi-idiocy before his crucifix and his skull. Far, far different. They had all relation to his fellow men. Every fibre of him throbbed with sympathy, and every nerve trembled and thrilled to influence and to draw his neighbor; and truly the power and the influence went forth! Perhaps there never was a man who had a greater and more powerful *personal influence* than this Bernard. I am not speaking just now of his preaching, although of course his personal influence was felt in all his preaching. I mean simply the effect which his presence or address produced on all who came near him. His will or his attraction was predominant and irresistible. At the glance of his eye, at the wave of his hand, his enemies wheeled round and joined the ranks of his retainers, as if they had heard the mighty 'follow me' of a greater than Saint Bernard."

The fact is that, whether he knew it or not, Gifford was possessed by a stern passion for truth, ultimate truth. He well knew that nothing great is ever accomplished without passion, but he consumed his own smoke, like a strong man. He tells us that "in all ages, men, the common run and bulk of men, are far more led and swayed by their feelings and habits and emotions than by their understandings. It is not he who sees the highest truth, but he who touches the deepest chord of feeling that can bend the multitude to his will." By this very element of feeling, he swayed his own will, and mastered himself, and thus rose superior to the traditional limitations of his time, making sure that, in the future, his countrymen, when sorely puzzled as he had been, could avail themselves of aids, for which he had longed doubtless, but could not obtain. His benefaction has served, and must go on serving, as a powerful lever for the destruction of the bonds that were his problems. We still see darkly as he did, but, thanks to him in large measure, we see more whole.

University of Michigan. R. M. Wenley.

THE DETERMINING OF GENIUS.

AMONG the many critics who have attacked my theory of genius and insanity, only one, Mr. Sergi, has discovered in it a true and capital deficiency. He says in *The Monist* (Vol. 10, No. 1., pp. 85 et seq.), that I succeeded in illustrating the nature of genius, but that I did not explain the existence of its varieties.

He did not mean that geniuses differ essentially in their quality; the nature of genius, whether mathematical or strategic, or literary, is constant and invariable. So calcium carbonate can crystallise either in rhombohedral or hexagonal systems; but its chemical nature is the same in both cases. Explosion, unconsciousness, novelty, intermittence, are common to all forms of genius. But, Mr. Sergi says, their having a common nature does not at all explain why they differ from each other. So the fact that both forms of crystallised calcium carbonate belong to the same chemical substance, does not explain why two forms exist. Water and ice have the same molecular and atomic composition of hydrogen and oxygen, but only a special physical condition of temperature makes them assume the appearance of water or ice.

Now, how can we explain the great variety of geniuses? Why does an artistic genius, an historical, an archæological, exist? This is a new problem, and heredity is not sufficient to solve it.

Sometimes surrounding influences, with predisposition and hereditary transmission, determine the form that genius shall take. So Darwin, St. Hilaire, Raphael, Bach, and the Bernoullis, were born of naturalists, painters, and mathematicians, and lived among

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[1] Translated from the Italian MS. of Professor Lombroso by Felice Ferrero.

them, finding in atavistic tendency and surrounding intellectual atmosphere, the first cause of their later work. But this is not a general rule; on the contrary, geniuses, particularly the scientific, show a tendency to—I might say—*dissimilar heredity*, by means of which sons are as different as possible from their parents. Edgar Allan Poe was a descendant of rigid Puritans.

Sometimes the environment alone and at large, particularly economic and social conditions, causes geniuses to follow their definite bent. Many a great jurist has lived in Italy, where crimes and litigations are very frequent, and warlike Piedmont has been the cradle of many a famous warrior. Among the Hebrews, who were and are great merchants, students of economics are numerous: recall, for example, C. Marx, Ricardo, A. Loria, L. Luzzati. The instance of Ricardo is peculiar; he had no inheritance of genius from his father, nor was he inspired by him; he simply shared in his father's business and speculations, and from commercial practice he drew economic applications, which are generally inspired by a very practical spirit, owing to his previous work and his rise subsequent to great commercial events, such as the monetary crisis of 1809.

But all these facts must be considered with much circumspection, because often it has been the very lack of favorable circumstances that has excited manifestations of genius and caused them to spring forth. Without misery and misfortune we should not now have the novels of George Sand and Harriet Beecher Stowe and the comedies of Goldoni. The history of genius is full of circumstances apparently opposed to its development. Boileau, Le Sage, Descartes, Racine, La Fontaine, Goldoni, were obliged to hide their muse beneath the grave garb of the lawyer and the theologian. Poisson's parents wanted him to become a surgeon; Herschel's and Cellini's meant to make players out of them. Michaelangelo's father wanted his boy to become an archæologist; never —he used to say—an image-scribbler. When a great sculptor saw the lad's first attempt and begged to have him placed in his own studio, Michaelangelo's father exacted of the sculptor a yearly sum for this privilege.

Flaubert was in his childhood intended for a lawyer.

Galileo had among his ancestors, up to 1538, several philosophers, magistrates, and great thinkers (cf. V. Nelli's *Life of Galileo*, 1793). Even his father, Vincent, was an original musician and a student of geometry; his brother Benedict was also a praiseworthy musician. But evidently his heredity had no direct influence on Galileo; nor had his education, because education in those times inclined strongly to rhetoric and classicism,—Nelli affirms that there was then only one school of mathematics and geometry in Tuscany, nor could his medical studies have been of any use to him, because medicine was quite theoretic and without the foundation of experiment.

It appears, then, from the above instances, that hereditary and surrounding conditions, once the causes most commonly assigned, either fail to explain the origin of genius-variation, or are contradictory or insufficient. Nor, to determine the special temper of a genius, is it enough to know the domination of acoustic or visual centers, the vivacity of fancy, the rapidity of synthesis that we discover so easily in his handwriting and style, although such conditions of intelligence have an enormous influence on genius. But a visual genius may become a poet, sculptor, painter, histologist, or calculator; and an acoustic genius may be a musician, or an orator, a poet, or critic, or novelist. This domination is not sufficient to settle the variety of genius. So I believe that there is another factor of utmost importance to which belongs the principal part in this determination, and with which heredity, environment and the peculiar nature of genius are co-operators: that is, according to my opinion—a strong impression received at puberty.

GENIUS AT PUBERTY.

He who analyses biographies of great men will find that in most cases the determining cause of creative direction lies in the combination of individual tendencies, with a very strong sensorial impression made at a time not far from puberty.

While a mere lad, Segantini's genius for painting had already

flashed upon the walls of the Reformatory where he was kept, and where his superiors wanted to make of him, willy-nilly, a shoemaker. Had they encouraged and rewarded him, he would, possibly, have been an able shoemaker, of whom nobody but his customers would have known; but they abused him; then he fled from his wicked protectors to his native mountains, where he became a shepherd. There he used to draw sheep and huts without any particular thought of it. Once—he was twelve years old then—he saw a little girl die, and her mother disfigure herself painfully, because she could not preserve her daughter's image. He was inspired, and made a picture of the child: from that day he was the great Segantini. The combination of strong moral and physical impressions, at the very beginning of puberty, with such a powerful visual talent, made him a genius as a painter.

Proudhon was the son of a wood-cutter; the curè of his parish had taught him a little Latin, and the Benedictine friars of Cluny the elements of drawing. At the age of fourteen, he was trying to copy some bad pictures in that convent, with colors made out of plant juices and brushes of mule hair, when a friar told him that he would never succeed with his strange methods, because those pictures were oil-painted. Such a remark was sufficient to make him find out the secrets of oil-painting by himself, as Pascal did those of geometry. (Gauthiers, 1136.)

Stuart Mill, at the age of twelve, was so deeply affected by studying his father's *History of India*, that his genius and passion for historical and economic events began at that time.

Arago, a lawyer's son, was precocious in music, and took an interest, while a youth, in classical studies. His passion for mathematics burst forth suddenly when an artillery officer told him that he had rapidly reached his position by graduating from the Polytechnic School and studying exact sciences. Then Arago quitted Corneille for mathematics; he studied them by himself, and at the age of sixteen was ready to take the examination for the Polytechnic.

Thomas Young was so precocious that at the age of two he could read, and at five he had learned a large number of English

and Latin poets, whose works he could recite by heart. When eight years old, he once met a land-surveyor, who showed him his instruments to calculate distances and the elevation of far-away bodies; he immediately set himself to study a dictionary of mathematics, to understand the structure of those instruments. He made a microscope by himself, and learned differential calculus in order to comprehend mechanics. (*Arago—Œuvres complètes*, 1854, Volume II.)

Galileo, up to his seventeenth year, made no physical discovery of any consequence; he felt himself inclined to exact sciences and detested the inexactness of metaphysics and medicine. But when at eighteen, in his third year of medical training, he saw in the Cathedral at Pisa a lamp regularly oscillating, he thought suddenly that he could invent an instrument for the purpose of studying the laws of isochronism, and examine the state of the pulse.

Lioy, in Martini's *Primo Passo*, says that he was eight years old, when, at the birth of a little brother, he was shut up in the library to keep him quiet, so that he should not disturb his mother, and a volume of Buffon was given him to read. It was the spark for his genius. "It seems to me as if I saw those birds yet; I dreamed of them all the night long; my place as a coming naturalist was settled."

Darwin, at eight, while he had already a great passion for collecting plants and animals, fancied, or rather, invented, and told to a school-mate, the story that he could change the hue of flowers by sprinkling plants with colored solutions. It was a mere story, but it shows that from those early years he had observed the variability of plants. The germ of that idea, which was to dominate his whole life, was concealed in this puerile fiction that afterwards became a reality. The great English naturalist believes that his having seen at that time a copy of a journey around the world, which greatly interested him, caused him to long for trips to far countries, and to travel, in later days, on the Beagle. On the contrary—he says—school, as a means of education, was simply a cipher to him. (*Vie et correspondence de Ch. Darwin*, 1888, p. 32.)

Poisson (*Arago—Œuvres*, V. III.) was to be, according to his

parents' wish, a phlebotomist; his education was entrusted to an uncle of his who pretended to instruct him by making him puncture the veins of cabbage leaves with his lancet; he was always making mistakes. But at eight or nine, he once saw a programme of the Polytechnical School and noticed that he could readily solve some of its problems: his career was discovered and his future settled.

La Fontaine was the son of an official, a poor verse scribbler. His genius was revealed when his attention was attracted to Malherbe's beautiful poem on Henry IV.'s death. Then he knew that he could be a poet, and such he was.

Gianni (*Universal Biography*) became a poet when first he read Ariosto. Then he made *extempore* verses, before he had learned the art of composition, shortly after puberty.

Lagrange had no great aptitude for study; his mathematical genius appeared when, as a high school student, he read one of Halle's writings; he wrote then his first essay on the calculus of variations.

Benjamin Franklin was the son of a mechanic. At eleven, he had to leave school, and, to earn his living, entered a soap factory, and later a printing-house where he could learn something. Having noticed for the first time the discharge of an electric spark in a toy machine, he imagined that lightning had the same origin, and discovered the theory of lightning and the lightning-conductor.

In all these cases, sensation did not rouse genius, but was the occasion of its revelation, and determined an individual who was organically predisposed, to turn to an end from which circumstances, education, etc., tended to take him and to separate him permanently.

So Darwin was predisposed by atavism to great naturalistic synthesis, because several of his ancestors had already worked in that direction, and his wit gave precocious proof of such predisposition in his idea of getting artificially colored plants. But, according to his own declaration, all the education he received was of no help to his later studies. The voyage of the Beagle was the point of departure for all his creations, and the intense wish for that

came to him from reading, at puberty, a book on a trip around the world (*Correspondence*, 1878).

Sir William Herschel was a player who had learned by himself languages and mathematics, without any special end in view. His having seen, at twenty-one, the field of the sky through a telescope, struck him so forcibly that he made a telescope himself, and was driven to study which metal alloy was the best reflector of light. The result was, that by the age of thirty-six he had achieved the construction of a great new telescope.

Lalande, a pupil of the Jesuits, composed dramas and novels at the age of ten; later, he aimed to be an eloquent lawyer: but when an astronomer made him observe the great eclipse of 1748, he felt his passion for astronomy, and became an astronomer, too; he was sixteen years old at that time.

Boerhave was intended to be a clergyman, and he took his degree of divinity. The idea of curing an ulcer that vexed his hand, roused in him his first passion for medicine.

Lalande, Lagrange, Young, thought of themselves as classical, literary men, until either astronomical instruments or demonstrations in geometry came accidentally into their hands; and Gianni, a stays-maker, became a poet after reading Ariosto's poems.

In some cases, however, the tremendous effect produced by the first impression, as in Guerrazzi, shows that a true transformation happened, owing to a sensorial impression at puberty; should such a sensation have been wanting, genius would never have developed. Guerrazzi writes:

"I must note an event which may be considered an epoch of my brain. My lot at that time, when I was twelve years old, brought Ariosto into my hands. My mind, made like the strings of a harp, to be moved by vibrations of beauty, and constrained, thus far, into the hateful coils of grammar and of convent-life, plunged into the joys of Ariosto's poems. Every man wishes for the paradise of his own fancy; to me the spirit of those times was a paradise and Ludovico was master. I used to dine with my *Orlando Furioso* by the bread; to sup, in the same way; and father had to put out all the lights in order to get me to bed. I don't know what my value is; my descendants will see that; but if I am worth something, I owe it to Ariosto." (*Autobiog.*, 1900.)

Here we can see the clear expression of the dynamogenous, fermentative capacity of a certain impression on a man of genius, during his pubescence, even in spite of his education's having pushed him in a direction contrary to his own innate tendencies. A last instance is offered by Galileo, whom his education drew in the way of classical, or musical, or medical studies, as we stated above; he felt inspired to mathematics and astronomy at the sight of a pendulum. This is a most characteristic example, because new applications of the pendulum kept occurring to his mind all through his life, to the very end. At first, when he was a medical student, in 1583, he applied it to pulse-measurements; then, when he interested himself in astronomy, to star and time-measurements —as one may read in a letter of his; and finally, in 1641, at Reagli, blind and near death, he thought that the idea could be applied to clocks—as is proved by a letter of Viviani—and only his blindness, which caused his drawings to be formless, and his death, prevented him from completing the work he had started at seventeen at the sight of the swinging lamp in the cathedral of Pisa. (Nelli's *Life of Galileo.*)

To many a genius the first impulse has been given by feminine beauty. Petrarch, at the age of fourteen, was drawn to poetry and a life of genius by the first sight of Laura. He wrote afterwards, April 6, 1327: "I don't deny that the little I am worth I owe to that woman, and that if I enjoy some fame or glory, it would never have been, had she not cultivated with so noble affections the little seed of virtue nature placed in my soul."

Nencioni tells us that his first poems, at twenty, were inspired by the sight of a very beautiful maid. De Amicis lately stated that one of the most brilliant writers of vernacular poems in Piedmont had not yet written a line at twenty-two, when he fell deeply in love with a lady of prominent position; some time afterward he met her in a railroad car, and in a moment when all the lights were accidentally extinguished, he felt her hand gently pressing his and knew that his passion was accepted and returned. A few hours later, he wrote the best of his poems, "A Shepherd's Dream," and was always, thereafter, a very able poet.

Dante declares in his writings that he was inspired by his meeting with Beatrice in his early youth.

Burns, a shepherd, who was already inspired by his mother's popular songs, wrote his first poem at fifteen, for love of a young girl.

Sometimes religious passion takes the place of erotic excitement. Lacordaire was roused by his first communion, and Rapisardi relates that, at thirteen, an ode to St. Agatha started the long series of his poems.

The great essential in these instances is that they all belong to childhood or pubescence. Now, men are undergoing external influences and strong sensations at any time, but without such a reaction as they show at puberty. Puberty has a tremendous importance for one's mental development, on account of its greatest impressionability to external causes. Youth is then in a condition of latent explosibility, ready to burst out under the pressure of every influence, whether of scientific theories, or of artistic enthusiasm, or of misfortune, or of strife. Adult man is thrown into the midst of new surroundings, new habits, new individuals, but they do not find such a quick echo in his soul, because his way is settled, he has sentiments and ideas of his own and may hardly be influenced.

A very important proof of this truth appears in Starbuck's *Psychology of Religion*. The author personally investigated the cause of conversion of many hundred students in seminaries and upper schools of America, with the following results:

	WOMEN	MEN
By parents	23 cases	32 cases
By familiar surroundings	30 "	52 "
By friends and acquaintances	34 "	42 "
By ministers	23 "	20 "
By teachers	0 "	6 "
By writers	17 "	17 "
By science	3 "	8 "
By art, music, poetry	8 "	15 "
By books	10 "	12 "
By deaths	0 "	13 "
By misfortunes	0 "	2 "
By internal struggles	0 "	0 "

He noticed that besides a more general influence on the part of parents, a very large proportion of influence was exercised by friends or teachers at particular times of life; or tales, sermons, poems, songs, listened to, or read, under particular circumstances, —these factors contributing to conversion as frequently as familiar surroundings. But in all these cases, this is the fact of actual interest to us, that any external influence, through friends, books, teachers, etc., acted, as the case is with genius, at puberty, during a period extended by Mr. Starbuck to six years, by including years immediately preceding and following puberty, the psychical and physical influence of which was found by him to last much longer, especially in the case of men. Indeed, it is evident from a graphic representation of his observations that the line representing the number of men's conversions in relation to their ages has three *maximums*, one at sixteen years, another at twelve, and a smaller one at nine. This curve is exactly parallel with Harnack's, for mental tests, in order to fix a maximum of intelligence, or, better, of reasoning power, in boys of the same country.

Mr. Starbuck gives also in his book many answers he got to his questions, and such answers show that influences were—as stated above for genius—momentary, enormous, as revelations quite out of proportion to events, having nothing peculiar in themselves. Some young men were converted after listening to the serious preaching of a friend or teacher they had known and loved and listened to, even before; or after reading a book, a story, a quotation, they had seen hundreds of times; hearing music, or witnessing a pitiful sight that had nothing worth notice in itself, but which agreed at the time with their particular condition of soul.

The same sort of thing occurs in the unseen, inner life, according to Mr. Starbuck's statement. Most of the men interviewed by him had noticed at some moment of their childhood a sudden revolution which determined a violent change in their characters, ideas and aims,—a transitory period of folly, he calls it. For many of them such a revolution was the cause of terrible melancholy; for others, of ferocious scepticism, or stupid passions.

Mr. Marro pointed out something like this in Turin schoolboys who become riotous, undisciplined, and bad at about twelve or thirteen years. (Marro's *La Pubertà*, second ed., 1900. Anthrop. Series, Vol. XXVI., Bocca Bros., Turin, Italy.) The result of an investigation of mine, attempted among forty educated young men, is that, at that time, impulsive, pyromaniac, kleptomaniac, and strikingly ambitious tendencies are very strong and diffused, sometimes even with slight hallucinations, and almost always with megalomaniac tendencies and demency alternated. Out of forty examined, sixteen declared that they noticed nothing or recalled nothing; seven remembered having, between eight and twelve years of age, a strange megalomania, in opposition to their family circumstances, to become conquerors of Verne's Islands or the Republic of San Marino; five stole at home in order to waste money, —they were workmen's sons and tried to make people believe that they were rich and powerful; five had persecuting ideas of being arrested by the police, or of becoming soldiers, when they were eight years old; three were insulting, quarrelsome, and villainous; two were seized by religious mania to become missionaries or hermits; two had obscene impulses, and one a suicidal tendency. A rich, very honest, young man, during pubescence, stole even coin pieces from shops, though he was not in need, and threw them away, or concealed them underneath stones, as soon as he had taken them. Another rich man had stolen a pair of shoes from a show-window, only to throw them away.

A lady-teacher in a Turin boarding-school told me that she had to look after three sisters, who successively attended her school; and that all of them were good and quiet up to twelve years, became intolerable liars, bad and insubordinate, from twelve to fifteen, and later resumed their previous character.

The fact is, that at that time a tremendous overflow of life is prepared and organised and perturbs the being, enveloping it as in a sort of coil, which can—at least temporarily—drag the feeble to their ruin, but exalt the strong to giddy heights; because at this age of complete reconstruction and transformation of the organism, the psychical centers are the most affected. This proves the truth

of a great writer's sentence, that he who never created anything in his youth, will never create anything later. Now, in this giddy movement it is natural that any most energetic, though formerly latent, activity, breaks its way, particularly when the electric shock of a special sensation has first thrust it in that direction toward which it naturally tended. So a fertile coupling happens that definitively polarises young people and causes a new organism of greater proportions to develop.

What happens transitorily in normal people would happen on a larger scale in geniuses; such an organic revolution is more pronounced and more manifest in the latter, as well as in criminals and the insane. The insane indeed show, above all in their psychopathies, a keen resemblance, almost an identity in the process of the formation of mad intellect, with that of genius ideas in men of genius.

Sometimes, although psychical activity is normal to a great extent, an impression received by an individual during, or shortly before, puberty, assumes such a great importance in him, as to determine all his actions, all his psycho-sexual content. Such is the case of those so-called *erotic fetishisms*, of people who can be sexually attracted only by seeing an old woman with a coif, or by holding a candle in the hand, or by being insulted, etc., that can be explained by means neither of atavism nor of neurosis. When those people are questioned, however, one learns that in the very moment of their first erotic excitement they were so powerfully struck by the image of an old woman with a coif, or with a candle, that they could be roused in no other way. A man who felt an erotic fetishism for women dressed as Italian models, recalled, in explanation of the fact, that he saw, while sixteen years old, in the first power of his puberty, a model of extraordinary beauty so dressed.

This is a phenomenon which is also common to genius, certainly owing to its degenerative character, by which the process of erotism remains crystallised in one of its first periods of sensorial excitement. Any one normal in his erotic passions is first excited by the sight of some feminine belongings; but in those abnormal

cases this moment absorbs the whole erotic process: so that the lover of a model's dress, above spoken of, no longer needs to see her face, or wants her to speak to him, to touch him, the first moment of excitement so wholly substituting itself for all the successive ones that the latter may be suppressed.

Even in many cases of hereditary paranoia a like phenomenon is observed, which explains some strange deeds normal and pathological psychology are quite unable to interpret. Individuals who received a strong impression in a particular circumstance were affected all through life by it, exclusive of others, although their *psyche* was altogether unchanged. Mr. Marro speaks of a girl who, upon hearing a man talk a long time on some parts of the body, felt a deep horror, became a maniac, and continually fancied men speaking of that matter. A girl was so impressed by a volcanic eruption that thereafter she believed herself to be always in the midst of volcanoes, and another was so frightened by a quarrel in a *bal-masqué* that always afterward she saw people with masked faces. De Quincey is the most typical case; having seen, when he was six years old, his dead sister lying on her death-bed, he was so struck by the sight that the sky and the clouds always seemed to him full of beds with dead girls in them; these visions lasted for the greater part of his life, so that he said himself that all our ideas exist as germs in the child, and chance—an accident, futile in itself, but decisive—causes them to develop.

THE FACTOR OF AGE.

Sometimes one notices that the influence on the creation of genius, as well as the determination of folly or religious conversion, did not concur with the time of puberty, but happened even long before as in De Quincey. That is clear, when it is understood that what we said must be applied to a longer period than that of puberty itself, and extended to years immediately following and preceding it. Some geniuses are so strangely precocious that infancy and youth are confused in them. Mozart was a composer at five; Gassendi, a preacher at four; Picodella Mirandola knew several

languages at ten, and Kotzebue wrote his first comedy at three. This precocity is often shown by Negroes and Esquimaux, and is evidently a degenerative characteristic, as criminals present it (31–45 per cent. of the cases); female offenders have their menstruation even two years earlier than the average.

SLOW IMPRESSIONS.

Sometimes, on the contrary, the fertilising impressions of genius are received, apparently, much later than at puberty. This is explained by the fact that circumstances prevented fertile contact from taking place, or such contact found a quite unprepared individual and was therefore unfruitful. Starbuck noticed some instances of slow conversions after thirty, but these cases happened when extreme poverty or extraordinary "family circumstances," obliged the individual to busy himself with the most pressing questions of life, and to compress every aspiration for great ideals.

So Caxton, born of very poor parents, growing up in the want of any education when a boy, was employed by a merchant who later became Lord Mayor of London. He acquired thereby great confidence, and was sent to Holland as a representative of the Merchant's Association; there he had occasion to hear about Gut tenberg's invention and that was enough to make him an inventor in this line.

In some of these instances the influence of puberty was a most important one, but stayed latent; it did not at once determine, but prepared for the bursting out of a genius's vocation, which happened only later, under other circumstances. Thus, Lacordaire received so deep an impression from his first confession at seven, that he preached on it in a touching way in a private chapel to his relatives, and recalled that time, many years later, as the germ of his career. When he was twelve years old his religious fervor was reborn in his first communion, which—he says—was the utmost joy of his life; after that he studied, became a lawyer, and had great success, when at twenty he was suddenly overtaken by religious enthusiasm which caused him to make a priest of himself. Evi-

dently, although he came to a decision only when an adult, his greatest incitement came to him in his earliest puberty.

Berlioz had already composed a *pastorale* at twelve; then he had his head stuffed by his father with classics and medicine. At fourteen he felt again his love for music, because of some operatic musical sheets which occasionally came into his hands; but although a musical fermentation was working in his brain, he kept on studying medicine and anatomy. Only at seventeen, when he listened to a performance of *Le Danaidi*, did he begin to hate everything that was not music, and lost his sleep over it; then he resolved to leave his medical studies and became the great composer. Unconscious influences acted, in such a case, before and at puberty, worked concealed for years, and burst out under a fortuitous circumstance, long afterward.

Therefore, while society cannot be held absolutely responsible for births of genius, because too many independent factors are required for its formation, it must be held responsible in so far as it has a great influence in causing genius to take a direction and follow a line, because almost all of the deep impressions which strike a boy in his puberty are excited by the environment which surrounds him. That is why great geniuses of Italy were for a long time bound to classicism and painting; as in the Hebrew race they were bound to mathematics, philosophy, and political economy: in Piedmont, particularly to war; in Germany, to commerce and industry; and in America, to inventions and practical applications. If business or military glory, or something else, be a constant and general tendency of a people's spirit, the impression thereof which strikes a boy of genius, will cause him to be an Edison rather than a Galileo; a Ferrari or Titian rather than a Stanley.

That is why I am opposed to the Italian classical education that presents to the minds of the new generations useless or dangerous examples, instead of practical instances, whereof the imitation could place Italy on the same footing with other nations. That is why I endorse and heartily support technical, scientific, professional, and, above all, industrial education. Such an education would give any born genius or talent the same opportunities and

chances to work at building up national wealth and strength, as it does in America and Germany, where the genius of industry and commerce is in its full bloom, although the genius of science and art may be declining.

CESARE LOMBROSO.

TURIN, ITALY.

ON THE NECESSITY OF ATOMIC THEORIES IN PHYSICS.[1]

IN addition to the atomic hypothesis now in vogue, there is a second method employed in theoretical physics which seeks to represent the facts of some given and very narrowly circumscribed domain by means of differential equations. We shall call it *mathematico-physical phenomenology*. Since this method offers a new constructive representation of the facts, and since it is of advantage to possess as many such representations as possible, unquestionably the new doctrine is qualified to take rank beside the atomistic hypothesis in its present form as a method of great value and utility. Another form of phenomenology, which I should like to term the *energic phenomenology*, will claim our consideration later.

Now, the opinion has grown rife that our representations of nature as drawn from phenomenological considerations enjoy intrinsic advantages over our representations as obtained by the atomistic method. It is my wont to avoid general philosophical discussions of this character, where there are no practical consequences at stake, for the reason that they do not admit of the precise formulation that special questions do, and consequently their solution remains largely a matter of taste. But I have the impression that the doctrine of atomism has, for the rather untenable reason above adduced, recently been fast losing ground, and I have therefore felt constrained to do what is in my power to avert the

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[1] Translated by T. J. McCormack from the *Proceedings of the Imperial Academy of Sciences of Vienna*, Vol. CV., No. 8, Section of Mathematics, Astronomy, Physics.

injury that I believe would result to science if phenomenology should be made a dogma, as atomism once was.

To avoid misunderstandings, I shall declare it at the outset to be the purpose of the following discussion to answer certain quite definite questions. And since the services that atomism has performed for science cannot possibly be a subject of doubt, these questions may be formulated as follows:

(1) Has not the atomic theory in its present shape distinct advantages over the phenomenologic theory now current?

(2) Is there any likelihood that there shall develop from phenomenology in the near future a theory possessing precisely the advantages which constitute the distinctive features of the atomistic theory?

(3) Granting the possibility of the atomic theory's being eventually discarded, does not the equal possibility exist that gradually phenomenology may become absorbed in the atomic theory?

(4) Finally, would it not be a positive detriment to science, if the reigning views of atomism did not continue to be cultivated with the same ardor as the views of phenomenology?

I may state at once that the outcome of the following reflexions will be to answer the foregoing questions in favor of atomism.

The differential equations of mathematico-physical phenomenology are obviously nothing but rules or directions for constructing and combining numbers and geometric concepts. But these numbers and concepts are themselves nothing but mental constructs from which the phenomena of nature may be predicted;[1] and such is precisely the case also with the constructs of atomism, so that for my part I can discover not the slightest difference between them in this regard. Indeed, to my mind and feeling no direct description of a comprehensive domain of facts, no single and exclusive mental representation of it, at all, is possible. It is accordingly wrong to say with Ostwald, "Thou shalt make unto thee no mental image or likeness whatsoever," but one may merely

[1] Compare Mach's *Principien der Wärmelehre*, Leipsic, J. A. Barth, 1896, p. 363. Mach's writings have contributed much toward shaping my philosophy.

say, "Thou shalt give to such images the fewest possible arbitrary features."

Mathematico-physical phenomenology often combines with its preference for the differential equations a certain disparagement of atomism. But it is my conviction that there is a vicious circle running through the reasoning that the differential equations transcend the facts in less degree than the most generalised form of the atomistic conception. Of course, if we are antecedently of the opinion that our sense-perceptions are mentally representable by the simile of a *continuum*, the differential equations will not, and the atomistic conceptions will, transcend our preconceived opinion. But quite different the case if we are wont to think atomistically: then the situation is reversed, and the conception of a *continuum* appears to transcend the facts.

Let us analyse, for example, the import of Fourier's equation for the conduction of heat, which has become classic in this regard. This equation is merely the statement of a rule, consisting of two parts:

(1) Conceive in the interior of a body (or, more generally, regularly aranged in some correspondingly bounded three-dimensional manifold) a large number of tiny things (call them elementary particles), each of which at the outset has any temperature you please. After the lapse of a very small interval of time (or on a very slight increase of a fourth variable), let the temperature of each particle be the arithmetic mean of the temperatures which the immediately surrounding bodies previously had.[1] After a like interval of time, repeat this process; and so on.

(2) Conceive both the elementary particles and the minute intervals of time to diminish constantly in size and their number to increase in a corresponding ratio until thermometric results are reached of sufficient accuracy to render the influence of further diminution inappreciable.

Likewise, the definite integrals that give the solution of the differential equations, can in general be evaluated only by mechan-

[1] Mach, *loc. cit.*, p. 118.

ical quadratures, or, in other words, themselves first require decomposition into a finite number of parts.

Let no one fancy he has attained a clear comprehension of what a continuum is from the mere utterance of the word *continuum* or merely by writing down a differential equation. On closer scrutiny, the differential equation will be found to be merely a statement of the fact that at the outset a finite number of things is to be held in the mind; this is the condition precedent of the entire process; not until afterwards is the number of the things increased until further increase is without influence on the result. Of what advantage is it now to suppress the postulate requiring us to conceive large numbers of individual things just after we have in our explanation of a differential equation defined by means of that postulate the value expressed by that equation? I may be pardoned the rather hackneyed expression if I say that the person who imagines he has cast off the thrall of atomism by differential equations does not see the woods for the trees. And as for explaining differential equations by complicated geometrical or other physical notions, this would be an out-and-out presentation of the subject in the light of an analogy, instead of a direct description. In point of fact, we are unable to distinguish the adjacent parts. But a constructive image in which we were unable to distinguish the adjacent parts at the very beginning, would be indistinct; we could not perform the prescribed numerical operations with it.

In declaring, therefore, a differential equation, or a formula containing definite integrals, to be the most appropriate representation of the facts, I am surrendering myself to an illusion if I fancy that in so doing I have eliminated the atomistic conception from my mental representation, without which conception the notion of limit is meaningless; I am rather merely making the additional assertion that to whatever degree of refinement our means of observation may be pushed, there will be no noticeable differences ever discovered between the limiting values and the facts.

Does not that constructive representation which assumes a very large but finite number of elementary particles, transcend the facts far less than such an implication? Is not the situation com-

pletely reversed? Whereas formerly the assumption of atoms of a definite size was regarded as a crude and arbitrary theory passing unnecessarily beyond the facts, now that assumption appears the more natural one, and the assertion that there will never be differences discovered between the facts and the limits for the reason that such have never hitherto been discovered (perhaps not once in all cases), adds to the representation something new and undemonstrated. Why the representation is made clearer, or more probable, by this adscititious and supplemental assertion is incomprehensible to me.[1] Atomism appears to be inseparable from the notion of a continuum. Laplace, Poisson, Cauchy, and the rest evidently proceeded from atomistic conceptions for the reason that inquirers were at that time more perfectly aware of the fact that differential equations were only symbols for atomistic conceptions, and that they therefore felt more vividly the need of simplifying these conceptions.

Like the equation for the conduction of heat, the fundamental equation of elasticity can in general be solved only by first conceiving a finite number of elementary particles which act on one another according to certain simple laws, and by subsequently seeking the limit after augmenting the number. This limit is thus again the real definition of the fundamental equations, and that representation of the facts which assumes at the outset a large but finite number of things, again appears the simpler.

We may obtain thus, by investing the atoms in question with as many properties as are necessary to describe a small province of facts in the simplest manner, a special atomistic system for every province of facts,[2] which, whilst it is in my opinion as little

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[1] Our sensations of sight correspond to the excitations of a finite number of nerve-fibers, and are thence doubtless better represented by a mosaic than by a continuous surface. The same holds true of the other sensations. Is it not more probable, therefore, that the models representing complexes of sensations are more fitly composed of discrete parts?

[2] If Hertz is consistent, he can assign to his statement that a definite system of differential equations constitutes his theory of electro-magnetic phenomena, no other meaning than that he thinks these phenomena under the image of two heterogeneous intellectual entities filling space and having both the characteristics of vectors, the variation of which in time, here with reference to intensity and direc-

a direct description as that which is commonly called atomism, is yet a representation of the facts as devoid as can be of adscititious elements.

Now, phenomenology endeavors to combine all these atomistic constructs without previously simplifying them, in order to de-

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tion, is, as in the conduction of heat, determined solely by the immediate environment, but is dependent on the same in a more complicated though readily assignable manner. We have given in this an atomistic theory of electro-magnetism, which contains as few adscititious elements as possible. The demand that this domain shall be explained mechanically, is but another expression of the need of simplifying the construct representing it and of rendering it homogeneous with the constructs representing the facts of the other departments. It is to this lack of homogeneity, which does not impress one on merely comparing the differential equations superficially, and to the probability that simpler constructs exist, that people doubtless wish to give expression when they say we do not know what electricity is.

The ordinary equations of the theory of elasticity, when additionally involving the displacements u, v, w, and the elastic forces X_x, X_y . . . ., represent (if the meaning of the notion of limits be recalled) pretty complicated rules for the variation of the coördinates $x+u$, $y+v$, $z+w$ of ordinary points, and the simultaneous variation of vector-atoms. Even the equations which arise after elimination of the elastic forces, are in need of some reduction before they yield the customary atomistic construct of elastic phenomena. To obtain the latter, certain combinations and decompositions of the equations or of the constructs representing them have to be performed, just as in mechanics forces have to be composed and decomposed in order to obtain as simple a description as possible.

Likewise, differential coefficients with respect to time impliedly require that in our mental construct of nature time shall be conceived at the outset as decomposed into very small, finite portions (time-atoms). If I relinquished, therefore, as unsubstantiated by experience, the view that deviations can never be discovered from the limit to which the construct approaches as the time-atoms are diminished in magnitude, I should be forced to the contention that even the laws of the mechanics of a material point are only approximately correct. Just to give some slight idea of the variety of the constructs at our command, I shall sketch forth here one special example of the representations in question.

Conceive in space (or better, in a tridimensional manifold) a large number of spheres in contact. The arrangement of these spheres varies, in accordance with a law A still to be determined, very slightly from one time-atom to another, but nevertheless by a finite amount. The variously formed interstices between the spheres take the place of the atoms of the old construct, and the law A is to be so chosen that the variations of the interstices in time shall furnish a theory of the universe. If it were possible to discover such a construct, which exhibited more homogeneity than the usual atomism, its title would be established by this fact alone. The conception of atoms as material points, and of forces as functions of their distance, is thus in all likelihood a provisional view, which for lack of a better must still be retained.

scribe the facts as they actually are, that is, to bring into conformity with them all the conceptions contained in these various atomistic theories. But, forasmuch as they introduce a multitude of notions gathered from many narrow provinces of facts, not to speak of a host of differential equations of which each, despite varied analogies, furnishes its own quota of idiosyncracy, it is to be antecedently expected that the description will assume an extremely complicated form. In point of fact, it appears that enormously complicated equations, utterly lacking in synoptic features, are requisite even when phenomenology attempts to describe the concatenation of some very few provinces of phenomena where the processes are virtually stationary (say, elastic deformation accompanied with heating and magnetisation, etc.). Furthermore, hypothetical features, features transcending the facts, must perforce be introduced when it is attempted to describe, for example, the dissociation of gases with Gibbs, or that of electrolysis with Planck.

Then there is the additional consideration that all the concepts of phenomenology have been derived from approximately stationary phenomena, and will not hold for turbulent motions. For example, we may define the temperature of a quiescent body by means of a thermometer inserted in it. If the body move as a whole, the thermometer may move with it. But if every element of volume of the body have a different motion, the definition is rendered nugatory, and it is then probable, or rather possible, that the different forms of energy (as to what is heat and what visible motion) can no longer be sharply distinguished.

If this be borne in mind, and account be also taken of the complications which the phenomenological equations assume even in the few instances where the concatenation of several provinces of phenomena is to be described, we shall obtain some conception of the difficulties encompassing the description by this method of turbulent phenomena in general, especially such as are accompanied with chemical changes, that is to say, of describing them without previously harmonising by arbitrary simplifications the various atomistic theories appertaining to the several provinces.

A special phenomenology, which I shall denominate the *energic*,

in its widest acceptation seeks to bring some sort of harmony into the atomistic theories appertaining to the different fields, by ascertaining what features are common to them. Two classes of such features are known. To the first class belong certain general theorems, like the conservation of energy, the principle of entropy, etc., general integral theorems as I might term them, which hold good in all provinces. The second class consists of analogies which pervade a great variety of provinces. These are largely nothing more than a similarity of form which certain equations always assume at a certain stage of approximation, whilst in more minute details the analogies would frequently appear to fail.[1] Yet, in spite of the enormous importance of the integral theorems, which is owing to their universal validity and the high degree of certainty that flows therefrom, and in spite of the importance of the analogies, which is due to the advantages in computation and the new points of view they offer, both integral theorems and analogies furnish a small fraction only of the entire range and compass of the facts. Inquirers were compelled, therefore, in order even to describe exactly single domains, to introduce additionally so many special constructs (the natural history of the domain), that they could not obtain, as I believe I have shown elsewhere, a single unequivocal and comprehensive description of any one department of stationary phenomena by this method, let alone a synoptic view of all, or, worst of all, of turbulent, phenomena. The question whether comprehensive representations of nature will ever be obtained along this line, has therefore a purely academic value.

To reach this latter goal, the current atomistic theory is seeking to bring the fundamental features of the various phenomenological atomisms into better conformity with one another, by arbitrarily extending and curtailing the properties of the atoms required in each province, and thus rendering them suitable for the simul-

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[1] Approximate proportionality of slight changes of the function to changes of the argument, the remaining of the first and second differential quotients with approximately constant coefficients, linearity with respect to small quantities and consequently superposition. So, too, the analogies in the behavior of the different forms of energy appear in part to have such purely algebraical sources.

taneous description of several provinces.[1] It decomposes, so to speak, the properties of the atoms required for a single province, into components (see p. 70, footnote), rendering them applicable to several provinces. Naturally, as in the case of the decomposition of forces into components, this is not possible without some violence and transcension of the facts.[2] In compensation, however, it enjoys the advantage of offering a simple and synoptic representation of a far greater mass of facts.

Whereas phenomenology stands in need of distinct and largely unallied constructs even for the mechanics of the movements of the centre of gravity and of rigid bodies, for elasticity, hydrodynamics, etc., the present atomic theory forms a perfectly apposite representation of all mechanical phenomena, and in view of the compactness of this province it is hardly to be expected that phenomena will yet be discovered that do not fit into the frame of the system. The atomic theory also embraces the phenomena of heat.

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[1] I do not mean to say by this that the phenomenologic equations have always preceded the advances made by modern atomism in point of time. As a fact, most of the phenomenologic equations were reached by the consideration of specialised forms of atoms taken from another province (mechanics), and did not acquire until subsequently, by being stripped of these considerations, the character of phenomenologic equations. This circumstance cannot surprise us when it is known that these equations in reality always involve the supposition of atomistic constructs, and it can therefore only tell in favor of atomism.

[2] One property of this sort arbitrarily introduced into our conception of atoms is their unchangeability. The criticism that we are concerned here with an unwarranted generalisation of the merely transitory unchangeableness of solid bodies, would be justified if we attempted, as was formerly done, to prove the atoms unalterable, *à priori*. We have introduced this property into our conception in order to render it capable of representing in aggregate as many phenomena as possible, just as we introduce into the equation for the conduction of heat the first differential coefficient with respect to the coördinates, in order that it may conform to the facts. We are ready to relinquish unalterability in all cases where another assumption would more fitly represent the facts. In reality, the vector-atoms of the ether mentioned in the footnote on page 70 would not be unalterable with the time.

The unalterability of the atoms belongs thus to those conceptions which have proved themselves of great service, although the metaphysical considerations by which they have been reached cannot stand before unbiassed criticism. But it is precisely owing to this serviceability that we are forced to grant at least the probability that radiant energy so called admits of representations by means of constructs similar to matter (that the luminous ether is a substance).

The fact that this latter circumstance cannot be definitely demonstrated, is due to the difficulty of calculating the molecular motions. In any event, all essential facts may be rediscovered in our theory, which has also proved itself extremely useful in the presentation of crystallographic facts, of the constant proportions of masses in chemical combinations,[1] of chemical isomerisms, of the relations between rotation of the plane of polarisation and chemical constitution, etc., etc.

Then, again, the atomic theory is susceptible of still greater development. We are at liberty to conceive among the atoms individuals endowed with any sort of properties, as, for instance, the vector-atoms, which, as we saw in the footnote on page 70, yielded for the time being the simplest description of electromagnetic phenomena.[2]

As to the turbulent phenomena which are as yet entirely inaccessible to phenomenology, the attitude of atomism toward these is admittedly one of definite preconceptions; yet in compensation for this bias, it offers valuable clues for the most likely modes of presentation of the phenomena, nay in many cases even enables us to predict them. Thus the theory of gases is able to predict the course of all mechanical and thermal phenomena in gases, even in

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[1] No chemical combination is produced instantaneously; each is propagated in space with a finite, though great, velocity. Applying therefore the analysis of the notion of continuity above presented, Mach's and Ostwald's theory of chemism will be found to assert that in each instance a elementary particles of one substance and b of another disappear, while c of a new substance make their appearance. The difference between this and the current conceptions of chemistry is manifestly not very essential. Nothing material would be altered if the limit as usually found should be made to represent the facts.

[2] If by a mechanical explanation of nature be understood one reposing on the present laws of mechanics, it must be declared to be altogether problematical whether the atomic theory of the future will be a mechanical explanation in the sense defined. Only in so far as it shall be under the constant necessity of supplying the simplest possible laws for the time-variation of numerous individual entities distributed in a manifold of probably three dimensions, may it be termed, at least in the traditional sense, a mechanical theory. For example, should no simpler description of electromagnetic phenomena be actually forthcoming, then the vector-atoms mentioned in the text would have to be retained. Whether the laws according to which these vary with the time are to be termed mechanical or not, depends wholly on our own taste.

the case of turbulent motions, and so affords indications as to how temperature, pressure, etc., are to be defined for these phenomena. Now this is precisely the chief end and purpose of science, so to shape the constructs representing one group of facts that from them may be predicted the behavior of other similar facts. It is understood, of course, that the prediction is afterwards to be checked by experiment. Probably it will be only in part confirmed. There is then hope of so modifying and supplementing the constructs that they will conform also to the new facts; which is tantamount to making new discoveries with respect to the constitution of the atoms.

Unquestionably, the demand is justified that no more adscititious elements (and even these are to be as general as possible) shall be added to the construct than are absolutely necessary to describe extensive provinces of phenomena, that we shall always be ready to modify the construct, nay, even to bear in mind the possibility that it might be advisable to substitute an entirely new and utterly different one in its place. And for the very reason that the construction of the new construct would have to be effected on the basis of the old special phenomenologic constructs that have remained intact, therefore these also are to be carefully cultivated by the side of atomism.

In conclusion, I am inclined to go so far even as to assert that it is of the very nature of a construct, that it should introduce certain arbitrary features in its attempts at representation, and that strictly speaking one transcends experience every time one infers from a construct conforming to a given set of facts a single new additional fact. It is mathematically certain that, in order to represent all the facts, we should not be permitted to put in place of Fourier's equation for the conduction of heat an entirely different equation, identical with Fourier's only in regard to facts previously observed, with the result that on the first new observation made we should have to alter our construct utterly and with it our entire conception of the interchange of heat among the smallest particles. All bodies hitherto investigated, for instance, might accidentally

exhibit just that particular group of regularities with the absence of which Fourier's equation would be rendered nugatory.

Just as Fourier transferred to the smallest particles (atoms) the law of specific heat and the fact that the interchange of heat between bodies in contact is proportional to the difference of the temperatures, so the theory of gases transfers to these particles the general laws of mechanics and the fact that bodies in close contact displace one another, but at some distance do not do so. With these smallest particles we cannot, as we see, dispense, when considering bodies of any size.

So, too, the assumption that the same atoms suffice for the description of both the liquid and gaseous aggregate states, appears to me, in view of the continuity of these two states, to be well founded, and conforms admirably with the requirement of simplicity in our description of nature. Granting the reasonableness of the two foregoing assumptions, we cannot escape the conclusion that the atoms are impressed with relative motions invisible to the eye, which absorb visible kinetic energy and the perceptibility of which by certain nerves is certainly not improbable (special mechanical theory of heat); and, further, that in highly rarefied bodies they usually describe nearly rectilinear paths (kinetic theory of gases). The construct by which we represent mechanical phenomena would only be made more complicated, if not self-contradictory, by abandonment of these conclusions. The additional assumption that the molecular motions do not cease whilst the induced visible motions are transformed gradually into molecular motions, also conforms perfectly to established mechanical laws.

All the consequences of the special mechanical theory of heat, howsoever disparate be the domains to which they pertain, have been confirmed by experience; indeed, I may say that they have been attuned in their minutest details to the rhythmical pulsations of nature.[1]

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[1] Of many instances I will mention but the explanation of the three states of aggregation and their transitions from one to another; further, the agreement of the concept of entropy with the mathematical expression of the probability or disorder of a motion. The assertion that a moving system of very many minute bodies

Fourier's assumptions with regard to the conduction of heat are of course of so extremely simple a nature, and the facts calculable from them conformed so perfectly to verified observations, that the assertion of his assumption and equations not being absolutely trustworthy, as first approximations, appears rather of the nature of casuistry. But I do not find it at all strange that the requirements of the situation should be satisfied by such extremely simple and plausible assumptions, for the province is very arbitrarily limited; or that subsequently facts greatly different from the kind already verified should be derivable from them.

If there should ever be forthcoming so comprehensive a theory as the present atomism, one likewise which reposed on so distinct and unassailable a foundation as Fourier's theory of the conduction of heat, then indeed this were an ideal. Whether this result is to be attained by the subsequent combination of the previously unsimplified phenomenologic equations, or whether it is to be realised by the eventual asymptotic approach of current atomic conceptions to the plane of evidence of Fourier's theory by continual adaptation and constant confirmation by experience,—this appears to me to be as yet entirely undetermined.[1] For, though the existing ob-

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tends, apart from unobservably few exceptions, towards a condition for which an assignable mathematical expression measuring the probability of the state is a maximum, appears to me to be superior, after all, to the almost tautological assertion that the system tends towards the most stable condition. As for the rest, Mach is correct in his conjecture (*loc. cit.*, p. 381) that at the time I composed a popular lecture on this topic I was unacquainted with the works cited by him as treating of the tendency toward stability, all of which but one were published years after my lecture, and all of them after the original papers of which my lecture was but a popular presentation.

If the principle of energy were the only support of the special mechanical theory of heat, and the explanation of that principle its only purpose, then the theory would be superfluous after the principle had been fully explained. We saw, however, that there are many other reasons speaking in favor of it, and that it furnishes a constructive representation of many other phenomena.

The theory of the electric fluids was from the outset artificial after an entirely different manner, and had been recognised by many inquirers from the start as provisional.

[1] Considerable remoulding and adapting (cf. Mach, *loc. cit.*, p. 380) are still to be done in the case of both theories. Fourier's equations for the conduction of heat

$$\frac{du}{dt} = k\,\Delta u$$

servations going to show that molecular motions in liquids and gases may be observed directly, be not regarded as conclusive, yet the possibility of future conclusive observations cannot be gainsaid. It accordingly seems to me utterly beside the mark to assert positively that such constructive representations of nature as the special mechanical theory of heat or the atomic theory of chemism and crystallisation shall ever vanish perforce from science. The sole question that can be raised is whether the precipitate zeal exhibited in the cultivation of such constructs, or the excessive caution that recommends total abstinence from them, be of greater disadvantage to science.

The extent to which physics, chemistry, and crystallography have profited from atomism in point of palpableness and perspicuity, is well known; that it has also been a clog, and hence in many cases has appeared as superfluous ballast, especially at the time when it far less perfectly conformed to phenomena than at present, and was more impregnated with metaphysical considerations, shall not be denied. Synoptic control will not be lost, nor certitude in the least impaired, if we rigorously sunder the phenomenology of the results that have been established with the greatest possible certainty from the atomic hypotheses that serve the purposes of unification, and continue to cultivate each with equal zeal, as alike indispensable. But we should not lay exclusive emphasis on the advantages of phenomenology and assert that this latter doctrine is one day to supplant the atomism now current.

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is, if k be constant, unquestionably wrong. That with k variable it should necessarily take the form

$$h\frac{du}{dt}=\frac{d}{dx}\left(k\frac{du}{dx}\right)+\frac{d}{dy}\left(k\frac{du}{dy}\right)+\frac{d}{dz}\left(k\frac{du}{dz}\right)$$

has hardly been sufficiently confirmed by experience. And it does not represent at all the effect on the distribution of heat of the compressions and dilatations inseparably incident to non-stationary conduction, or the direct action of the heated volume-elements on other more remote elements in a diathermanous body by thermal radiation (and who knows but all bodies are diathermanous for certain rays transmitting energy and necessarily therefore also heat). If it be said these phenomena are not part of the process of pure thermal conduction, it may be replied that a pure process of this character is then nothing but a metaphysical hypostatised concept.

Even though the possibility exist of combining the constructs of phenomenology into a comprehensive theory differently from the manner pursued by atomism, still the following points must be admitted:

(1) This theory can never be a mere inventory, in the sense of having a definite symbol attached to each individual fact: it would in such a case be as difficult to command the situation as it would be to have experience of all the facts individually and severally. Like the present atomism, therefore, it can be nothing more than a body of directions for the construction of a theory and view of the world.

(2) If we will but free ourselves from illusion regarding the meaning of a differential equation, or of any continuously extended magnitude generally, we cannot fail to see that the phenomenologic view of the world is itself necessarily an atomistic view, viz., a direction to think by certain definite laws the time-changes of an immensely large number of things arranged in a manifold of probably three dimensions. The things in question may of course be either homogeneous or heterogeneous, variable or invariable. By assuming a large finite number or the limit of a continuously increasing number, our construct could correctly represent all the phenomena.

Assuming the possibility of an all-embracing theory of the world, every feature of which has the same evidence as Fourier's theory of the conduction of heat, it is still a question whether it can be more easily reached by the phenomenologic method or through the perfection and empiric confirmation of the constructs of atomism. It would be even permissible to assume that several representations of the world were possible, all of which possessed the ideal traits.

L. BOLTZMANN.

LEIPSIC.

KANT'S SIGNIFICANCE IN THE HISTORY OF PHILOSOPHY.

PHILOSOPHY is frequently regarded as vain verbiage; and the great mass of the average productions of this branch of human endeavor would seem to justify the statement. Nevertheless, philosophy has exercised a paramount influence upon the history of mankind, for philosophy is the quintessence of man's conception of the world and the view he takes of the significance of life. While philosophical books, essays, lectures, and lessons may be intricate and long-winded, there is at the core of all the questions under discussion a public interest of a practical nature. The problems that have reference to it are, as a rule, much simpler and of a more common application than is apparent to an outsider, and all of them closely considered will be found to be of a religious nature.

KEYNOTES IN THE HISTORY OF PHILOSOPHY.

When we try to trace the erratic lines of the history of philosophy, the advance seems slow, but the results, meagre though they sometimes may be, can be summarised in brief statements. Thus the sophistic movement in Greece in contradistinction to the old naïve naturalists, Thales, Anaximander, and Anaximenes, is characterised by the maxim: *πάντων μέτρον ἄνθρωπος*, [Man is the measuse of all things], which is the simple solution of a series of intricate problems. In spite of its truth, it was misused by unscrupulous rhetoricians, who disgraced the profession of sophists and degraded the noble name of their science, called sophia, i. e., wisdom, to such an extent that the term "sophist" became an epithet of oppro-

brium. Socrates opposed the sophists, but in all theoretical points he was one of them. There was only this difference, that he insisted on the moral nature of man and thus became the noblest exponent of the sophistic principle. It indicates a new departure that he changed the name sophia to philosophia or *philosophy*, i. e., love of wisdom, which was universally accepted as more modest and better becoming to the teachers and spiritual guides of mankind. While he granted that man is the measure of all things, he pointed out the duty of investigating the nature of man, and he selected the Delphic maxim: γνῶθι σεαυτόν, "know thyself," as a motto for his life. It would lead us too far to show how Plato worked out the Socratic problem of the human soul, which led him to a recognition of the significance of forms, as expressed in his doctrine of ideas, and how Aristotle applied it to natural science. The Neo-Platonists developed Plato's mystical and supernatural tendencies and prepared thereby for the rise of a dualistic religion.

When Christianity became a dominating power in the world, philosophy disappeared for a while, being replaced by the belief in a divine revelation as the sole source of all wisdom; but in the Middle Ages philosophy was revived as scholasticism, the impulse to the movement being due to the revival of Aristotelianism, through an acquaintance with the writings of cultured Arabian sages.

In the era of scholasticism we have two authorities, Revelation and Science, the former conceived to be identical with the verdicts of the Church, the latter being a blind acceptance of a second-hand and much distorted knowledge of the philosopher's works. The Platonic problem of the eternal types of things was revived, and Nominalists and Realists contended with one another on the question of the reality of ideas. In their methods, however, these two conflicting schools were on the same level, for both were in the habit of appealing to certain formulæ. With them proof consisted in quotations either of church doctrines or of passages from Aristotle. There was no genuine science, no true philosophy, the efforts of the age consisting in vain attempts at reconciling the two conflicting authorities.

Modern philosophy is a product of the awakening spirit of sci-

ence, beginning with Descartes who proposed to introduce method into philosophy, as expressed in his *Discourse on Method.* He abolished the implicit belief in book authority. Falling back upon the facts of life, he bethought himself of the significance of Man's thinking faculty, and so, starting again from the subjective position of the sophists, he defined his solution of the basic problem with great terseness in the sentence: *Cogito ergo sum*, [I think, therefore I am].

The latest phase in philosophy begins with Kant, and it is his immortal merit to have gone to the bottom of the philosophical problem by reducing its difficulties to a system. In the Cartesian syllogism he saw a fallacy if it was interpreted to mean "*Cogito ergo ego sum.*"

The subject *ego*, implied in "*sum*," is implicitly contained in "*cogito*," and thus if the sentence is meant to prove the existence of a metaphysical ego, the argument is a fallacy, being merely a deduction derived from the assumption that the ego does the thinking.

Kant took the next step in seeking for the principle that determined all thinking, and discovered it in the purely formal laws of thought, which in their complete unity constitute pure reason. The investigation of the conditions of thought, he called "criticism." He insisted that all dogmatical declamations of the several systems of metaphysics were idle and useless talk. He said they were vain attempts at building a mighty tower that would reach to Heaven. But at the same time he claimed to prove that the supply of building materials was after all sufficient for a dwelling-house spacious enough for the needs of life and high enough to survey the field of experience.[1]

In place of the old metaphysics which used to derive from pure concepts a considerable amount of pretended knowledge concerning God, the world, and man, concerning substance, as the substratum of existence, the soul, the future state of things, and im-

[1] See *Critique of Pure Reason* in the chapter "Transcendental Doctrine of Method," Max Müller's translation, p. 567, Meicklejohn's, p. 431, original edition, p. 707.

mortality, Kant drew up an inventory of the possessions of Pure Reason and came to the conclusion that all knowledge of purely formal thought is in itself empty and that sense-experience in itself is blind; both combined form the warp and woof of experience, which alone can afford positive information concerning the nature of objects. Empirical knowledge of the senses furnishes the material, while formal thought supplies the method by which perceptions can be organised and systematised into knowledge. Kant's aim was not to produce glittering generalities, but to offer critique, that is to say, a method of, and norm for, scientific thought; and he said, conscious of the significance of his philosophy:

"This much is certain, that whoever has once tasted critique will be ever after disgusted with all dogmatical twaddle."

Dogmatism in metaphysics is the dragon which Kant slew. But what does that signify?

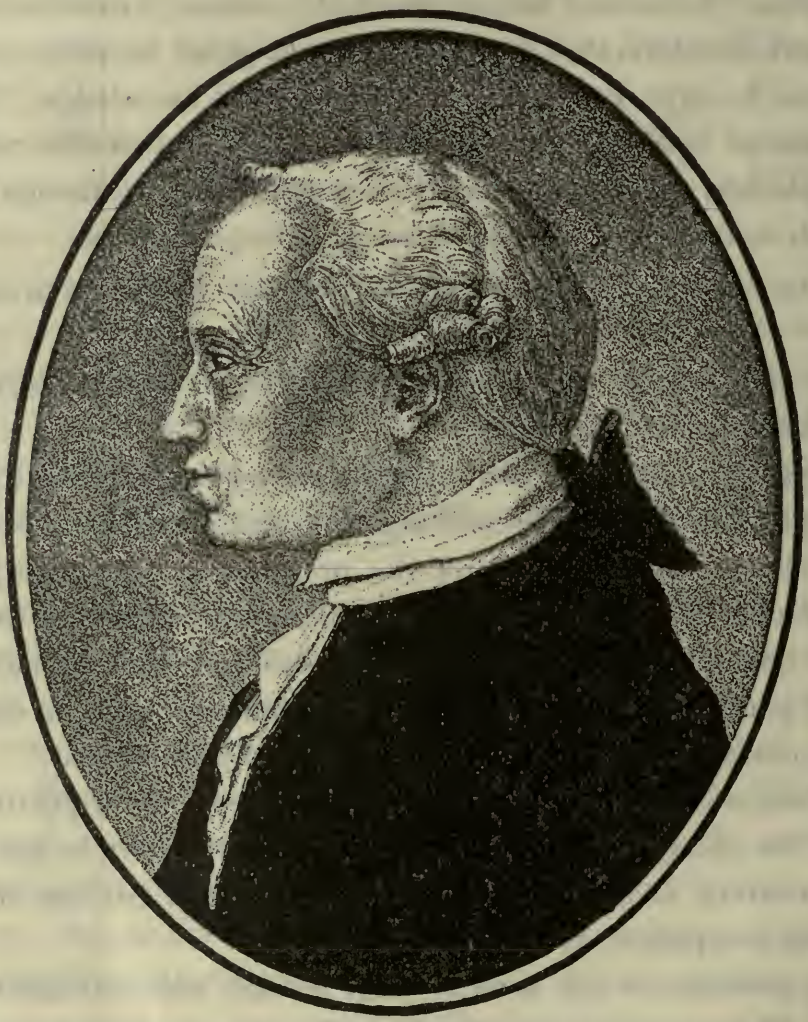
Mystic tendencies of a religious nature such as found a classical exposition in Kant's contemporary and namesake, Emanuel Swedenborg, rendered some of the problems of philosophy more complicated by laying a special stress upon the difference between matter and spirit, and discussing the possibility and probable nature of purely spiritual beings; but all philosophising on the subject consisted in declamations and unproved propositions.

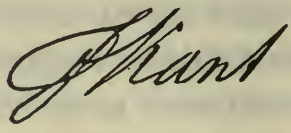
Wolf, a clear-headed thinker, though void of originality, reduced the metaphysical notions from Aristotle down to the eighteenth century to an elaborate system, and thus became to Kant the typical exponent of dogmatism.

In contrast to the metaphysical school, the sensualists had risen. They are best represented by Locke who denied the existence of innate ideas (except the idea of causation) and tried to prove that all abstract thought had its origin in sensation. Hume, taking offence even at the claims of causation as a necessary connexion, declared that, accustomed to the invariable sequence of cause and effect, we mistake our subjective necessity of thinking them together for an objective necessity, which remains unproved. Thus he turned skeptic and gave by his doubts regarding the objective validity of causation as a universal principle and a meta-

physical truth the suggestion to Kant to investigate the claims of all metaphysics, of which the notion of causality is only a part.

Here Kant's philosophical reform set in, which consists in rejecting both the skepticism of Hume and the dogmatism of Wolf- and in offering a new solution which he called criticism.





PERSONAL TRAITS.

Kant, the son of simple but rigorously pious parents of Scotch extraction, was born at Königsberg in Prussia under the rule of

Liebster Freund!

Ihr schon bestellter Übersetzer Hofr. Reimer, mit Ihrer und der Ihrigen Freundin, meiner werthen Tischgenossin, bis mir abgelaufen ist, hat mir etwas sich näherer Nachfragen mir Ihr aufgehalten Fällen Ihnen lässt, mich bey der Übersetzung zu bringen. Unerachtet dieser schmerzhaften Gleichgültigkeit habe ich an Ihnen allein so lange wie ergebenheitig Ihnen, oft genug, Freuden aus dem unmittelbaren Verhältniß der in unserm Alter von 68 Jahren der nicht unser Lebensabschnitt zu Ihnen, Freund, die älteste Unsere zarte übrige, Ihnen noch übrigen Schwestern sind, die älteste Ihnen 5 verschiedenen und zum Theil schon verschiedenen Kinder sind, gänzlich mich die anhaltende in Ihr Vorgesetzte Hospital mitgetheilt ist, schuldigen Zeugnis. besorgt. Ihr Kinder ihr noch Jahre bey ihrer anfänglichen Sorge Ihnen Einrichtung, meinem Beystand, und auf nachher nicht versagt ist, das etwas die Pflicht der Dankbarkeit zeugen ihr uns von unserm gemeinschaftlichen Leben gemachten Einsicht Vorbehaltnisse vorkommt wird. Wenn Sie mir nimmt von ihrer Zustand ihrer eigenen Familien Nachricht geben will, so wird es mir angenehm sein.

Übrigens bin ich in Erwartung meiner mir sehr werthen Bestätigung, mit unveränderter Zuneigung

Ihr

Ihrer treuer

J Kant

Koenigsberg
26 Januar
1792

Frederick the Great.[1] His moral sense was stern and unalloyed with sentimentality. He never married, and his relation to his relatives was regulated strictly according to his views of duty.[2] In his philosophy as well as in his private life he was duty incarnate. While he had imbibed the sense of duty that characterises the system of education in Prussia, he was also swayed by the ideals of liberty and fraternity so vigorously brought to the front by the French revolution.[3] His influence on the German nation, on science, religion, and even politics cannot be underrated, although his ideas did not reach the people directly in the form he uttered them, but only indirectly through his disciples, the preachers, teachers, and poets of the age. His main works which embody the gist of his peculiar doctrines are the *Critique of Pure Reason*, the *Critique of Practical Reason*, and the *Critique of Judgment*. Among them the *Critique of Pure Reason* is by far the most important one.[4] It is a pity that the *Critique of Pure Reason*, from the appearance of which the historian dates the beginning of the latest period in the evolution of philosophy, is a ponderous and almost unintelligible work,—a book with seven seals to the average reader; and it might have remained ineffectual had not Kant been necessitated to rectify this defect by giving to the public a popular explanation concerning his intentions.

The *Critique of Pure Reason* was published in 1781. In the

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[1] For a good condensed statement of Kant's life see Professor Windelband's *History of Philosophy*, translated by Prof. James H. Tufts of Chicago, p. 534. For a convenient chronological table of the data of Kant's life and publications see Paulsen's *Kant*, pp. 393–395 (Frommann's *Klassiker der Philosophie*, Vol. VII., Stuttgart, 1898).

[2] We here reproduce a sample of Kant's handwriting, a letter of his to his brother, which plainly characterises his business-like conception of duty which regulated his life with machine-like precision.

[3] Heinrich Heine described Kant to the French most drastically in an essay on German philosophy, a German translation of which made by the author himself is contained in Heine's *Gesammelte Werke*.

[4] A splendid analysis of the three *Critiques* is given by Prof. A. Weber in his *History of Philosophy*, translated from the fifth French edition by Prof. Frank Tilly, pp. 436–472. The compilation of Kant's philosophy in a *Kantlexicon* by Gustav Wegner (Berlin, 1893) is not very serviceable. The book is unhandy and lacks the main requisite of a lexicon, a good index.

Critik
der
reinen Vernunft

von

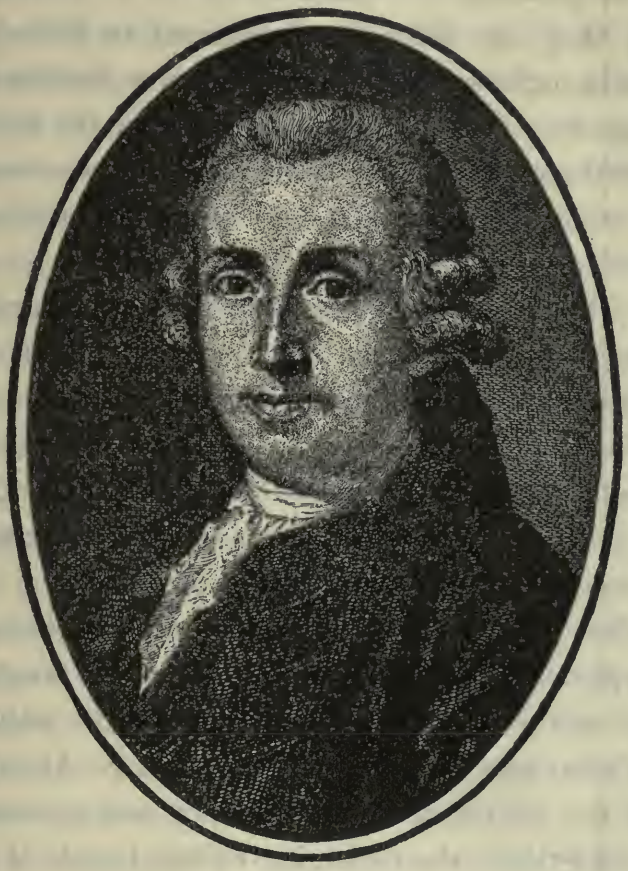
Immanuel Kant

Professor in Königsberg.

Riga,
verlegts Johann Friedrich Hartknoch
1781.

TITLE PAGE OF *The Critique of Pure Reason* (RIGA, 1781).

Göttingenschen Gelehrten Anzeigen of January 19, 1782, there appeared a review of the book, written by Garve and modified by Feder, which irritated Kant considerably, because the review treated his criticism as a revival of Berkeley's idealism, which was commonly regarded as pure subjectivism.[1] There is no need here of protesting in Berkeley's name against this interpretation of his phi-



losophy, for we are concerned here with Kant, not with Berkeley. But even Kant misunderstood Berkeley, and for our present pur-

[1] Garve's letter to Kant and Kant's answer contain the whole material of the history of this garbled review. They are interesting reading but mainly of a personal nature, consisting of explanations, excuses, and polite words. For a reproduction of this correspondence see Reclam's text edition of Kant's *Prolegomena*, Appendix, pp. 214 230.

pose it is sufficient to say that Berkeley's idealism meant to Kant and his contemporaries pure subjectivism.[1]

Kant was irritated because his philosophy was disposed of as an old error, a method which (as Paulsen says) has been developed into a regular system among a certain class of Roman Catholic critics who regard the possibilities of philosophising as exhausted in the history of philosophy. Claiming to be in possession of the whole truth, they are naturally disinclined to believe that new truths can be brought to light. Thus they have developed the habit of associating every new idea with some one of the systems of the past which to them are nothing but a *catalogus errorum*, and serve them as so many coffins in which to bury any doctrine that does not receive their approbation.[2]

Kant's indignation was perhaps exaggerated, for he ought to have considered the difficulty of understanding a doctrine that was at the same time utterly new and presented in a most unattractive, pedantical form; but the result was happy, for he felt urged to write a popular explanation of his work, to offset Garve's misconception, which would serve the reader as *Prolegomena*, i. e., as prefatory remarks to the *Critique of Pure Reason.*

These *Prolegomena* insist on the newness of Kant's proposition and emphasise his adhesion to realism (or the doctrine that the objective world is actual) in contrast to the subjectivism of Berkeley, or what was supposed to be Berkeley. At the same time they possess the charm of wonderful vigor and directness. Here Kant does not write in the pedantic, dignified style of a professor, but with the boldness of a resentful author who, conscious of his title to careful consideration and believing himself to be wrongly criticised, is anxious to be properly understood by the public.

While the *Critique of Pure Reason* is synthetic, the *Prolegomena* are (as says Kant himself) analytic. In the *Critique of Pure Reason* Kant discourses as one who speaks *ex cathedra*, sitting in

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[1] For a condensed statement of Berkeley's idealism see Thos. J. McCormack's preface to Berkeley's *Treatise Concerning the Principles of Human Knowledge* Chicago, The Open Court Pub. Co., 1901, especially pp. xii–xiv.

[2] See Friedrich Paulsen's *Kant*, p. 229.

the professorial chair; he propounds his doctrine deductively, and I for one can very well understand that his expositions appear to an uninitiated reader bewilderingly oracular. In the *Prolegomena* his style is not stilted but rather careless and though his periods are long they are fluent and easily understood.

KANT'S TERMS.

The main difficulty of understanding Kant, to later generations, and also to foreigners not to the manner born as regards the German vernacular, lies in his terminology. Simple though his terms are when once understood, they afford unsurmountable difficulties to those who are not familiar with their significance.

Familiarity with the following terms is indispensable for a comprehension of Kant: "metaphysics"; "understanding" and "reason"; "empirical" and "experience"; "noumenon" and "phenomenon"; *a priori* and *a posteriori*; "transcendental" and "transcendent"; and "intuition" or *Anschauung*.

First, above all, there is the term "metaphysics," which is the science of first principles. Aristotle, who discusses the subject of ἀρχαί, or first principles, in books placed after the physical treatises (hence the name τὰ μετὰ τὰ φυσικά, *sc.* βίβλια, corrupted into metaphysics), calls it First Philosophy, i. e., the Essence or basis of Philosophy, and identifies it with Theology, because he finds in God the ultimate *raison d'être* of all metaphysical concepts such as being and becoming, space and time, multiplicity and unity, things and the world, cause and effect, substance and quality, God and soul and immortality.

Kant started a new line of investigation and kept in view his main aim. So it was natural that he did not feel the need of certain discriminations before his work was pretty well advanced. This accounts for a few inaccuracies in the use of his terminology, covering the terms "understanding," "reason," and "experience." He distinguishes in his *Prolegomena* between reason and understanding, but the discrimination is by no means thoroughly carried out. The understanding is defined as the use of the categories, and reason the faculty of forming ideas. The understanding accordingly

represents the logical functions, and reason the domain of abstractions and generalisations. The understanding draws conclusions and attends to the machinery of thinking, reason seeks oneness in plurality, aims at a systematical comprehension of things apparently different and establishes laws to explain the variety of phenomena by one common rule.

By "empirical" Kant understood all those judgments that contain sensory elements. They were either mere perceptions, i. e., a taking cognisance of sense-impressions, or experience, i. e., the product of thought and perceptions, resulting in empirical statements that are universally valid.[1]

The contrast of perceptions, as the sense-woven pictures of things, and ideas or the mind-begotten concepts of them, is expressed in the two terms "phenomenon" or appearance, and "noumenon" or thought. Kant translates the former by the word *Sinneswesen*, i. e., creature of the senses, and the latter by the word *Gedankenwesen*, i. e., creature of thought.[2]

Noumenon should not mean "thing in itself," as which it is actually used by Kant contrary to his own definition, but man's subjective conception of the thing in itself. If the phenomenon is subjective appearance, the noumenon, far from being objective, ought to be, according to Kant, still more subjective, being a mere subjective digest of the materials furnished by the subjective phenomenon.

The terms *a priori* and *a posteriori* are of special significance. They mean "before" and "afterwards," but we must bear in mind that they should be understood, not as a temporal succession, but in a logical sense. *A priori* cognitions are the principles which the naturalist uses in his investigations; but his investigations themselves, consisting of sense-experience, are *a posteriori*. Before

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[1] That Kant's use of the term "experience" was not always consistent I have endeavored to explain elsewhere. See *Primer of Philosophy*, pp. 30 ff.

[2] Pronounce *no-oomenon*, not *noomenon*. The original Greek reads *νοούμενον*. The *ou* in the German transcription, "*No-umenon*" was misinterpreted as a French *ou*; hence the erroneous pronunciation of some English lexicographers as "noomenon."

he begins his investigation, the naturalist must know that $2 \times 2 = 4$, that there can be no effect without a cause, that he can rely on the rule of three and on the syllogisms of logic. The knowledge of these truths is the condition of science, and all these truths are universal, i. e., they apply to all possible cases. *A priori* knowledge has developed through the practice of sense experience. Indeed, sense-experience came first in temporal order; but sense-impressions would forever remain a mass of isolated things were they not systematised with the assistance of *a priori* principles.

A priori does not mean innate, for neither mathematics, nor arithmetic, nor logic is innate; but the theorems of these sciences can be deduced in our thoughts without calling upon sense-experience to aid us. Innate ideas would mean inherited notions, like the instincts of animals. The characteristic feature of *a priori* conceptions is not that we know them well nor that we find them ready-made in our minds, but that they have a universal application and are therefore necessary truths.

The contrast between *a priori* and *a posteriori* truths is easily explained when we consider that the former are purely formal, the latter sensory. The former therefore cannot give us any information concerning the substance, the matter, the thingish nature of things (as Kant expresses it, "they are empty"), but they can be used for determining the relations and forms of things, and this renders them uniquely valuable, for science is nothing but a tracing of the changes of form, an application of the laws of form, a measuring, a weighing, a counting; and their paramount importance appears in this that our knowledge of the laws of form will in consideration of their universal validity, result in the possibility of predetermining future modifications under given conditions.

There are two synonyms of *a priori*, the word "pure" and the term "transcendental."

Reason unalloyed with notions derived from sense-experience, and therefore limited to conceptions *a priori*, is called pure reason. "Transcendental" means practically the same as pure and *a priori*. By transcendental discourses Kant understands those which transcend experience and consider its *a priori* conditions. Thus, tran-

scendental logic is pure logic in so far as pure logic is the condition of applied logic. Transcendental psychology is the doubtful domain of abstract notions concerning the unity of the ego, its substantiality and permanence, etc. Transcendental cosmology consists of the ideas of existence in general and the universe in particular. Then the questions arise as to the world's infinitude or limitedness, its eternity or beginning and end. Further, whether or not causality is absolute, viz., is there contingency only, or is an uncaused will possible? Here the oracle of pure reason fails and Kant formulates the result in his strange doctrine of contradictions, or as he calls it, antinomies of pure reason.

Transcendental cosmology, transcendental psychology, transcendental theology, are not sciences, but the dreams of metaphysics. As such they transcend experience to the extent of becoming hazy. They cease to be accessible to comprehension and are then in Kant's terminology called "transcendent."

Mark the difference between the two terms: the word "transcendental" denotes the subjective conditions of all experience, consisting in the recognition of such truisms as logical, arithmetical, and geometrical theorems, which are the clearest, most indisputable, and most unequivocal notions we have. Transcendent, however, means that which lies beyond the ken of all possible knowledge within the nebulous domain in which we can as well affirm as deny the possibility of assumptions. Consider at the same time that in the English language "transcendental" is a synonym of "transcendent," and the difference made by Kant has been slurred over by many of his expositors. What a heap of confusion resulted from this carelessness! We need not wonder that his radical system of transcendental criticism was transformed into that uncritical metaphysicism, or dabbling in unwarranted transcendental notions which Kant so vigorously and effectually combated.

The confusion which English interpreters produced by their neglect of distinguishing between "transcendent" and "transcendental" was increased by their misconception of the term *Anschauung*, which, being properly but not adequately translated by its

Latin equivalent "intuition," became tinged with all the mysticism and metaphysicism of intuitionalism. "Intuition," according to the commonly accepted use of the word, means in the English as well as in German "the power of the mind by which it immediately perceives the truth of things without reasoning or analysis." As such intuitions signify not only the images of sense-perception, but also, and indeed mainly, ecstatic visions in which the soul is face to face with presences spiritual, supernal, or divine; and thus it happened that under the guarantee of Kant's criticism the most extravagant speculations could gain admission to the philosophical world as genuine philosophical ideas.

Anschauung, like the Latin *intuitio*, signifies the act of *looking at* an object; it denotes the sensation of sight. However, its use is not restricted to sight, but extends to all sense-perception. The peculiar feature of sense-perception consists in its directness and immediate appearance in our organs of sense as sensation. When we look at a tree we do not argue; we simply see the tree. We need not know anything about the physical processes that take place both outside in the domain of ether-waves which are reflected on the sighted object, and within our eye where the lens produces an image that is thrown upon the surface of the retina, in the same way in which the photographers's camera produces a picture on the sensitive plate. The picture seen is the result of the process, and all epistemological considerations are afterthoughts. The same is true of all sensations. Sensations, though the result of complicated processes, are given facts; they are the data of experience and there is no argument in them, no reasoning, no deliberation, no hesitation, as to their truth; they are the realities of life, and from them we construct our notions of the world in which we live.

It is a pity that we have not a Saxon equivalent for the German *Anschauung*. We might coin the word "atsight," which (in contrast to insight) would denote the act of perceiving a sighted object; but the word, in order to make the same impression, ought to be current, which the term atsight is not. The translation "intuition" is admissible only on the condition that we exclude from it all mystical notions of subjective visions and define it as visual-

ised perception. There are passages where *Anschauung* is an exact synonym for "sense-experience" or "perception," and we might translate it thus were it not for the extended use Kant makes of the term by speaking of *reine Anschauung*, meaning thereby the pure forms of sense-experience which are as much immediate data of perception as are the sense-elements of sensation.

If we had to recast the exposition of Kant's philosophy we could avoid the term "pure intuition" and replace it by the pure forms of sense-experience, but if we would render Kant in his own words we cannot do so. The translator must reproduce Kant in his own language, and thus must either invent a new word such as *atsight*, or must cling to the traditional term *intuition*.[1]

KANT'S IDEALISM.

The contrasts in Kant's terminology, *a priori* and *a posteriori*, formal and material, pure reason and experience, etc., do not yet imply the conclusion at which he arrives, the main result being the ideality of space and time and of all pure forms of thought. Kant was led to it by a strange fallacy, the error of which we intend to trace in the present article.

First let us try to understand the point of view which Kant took.

The pure form of our sense-perception is the relational in the domain of sensory elements, viz., their juxtaposition, or space, and their succession, or time, their shape, their causal intercatenation, etc.

In his discourse on the pure forms of sense-perception (called "Transcendental Æsthetics"), Kant points out first of space, then of time, that they are notions which are:

1. Insuppressible (viz., we can think or assume in thought the non-existence of all objects, but not of space or time).

[1] Mr. Kroeger's proposition, made in the *Journal of Speculative Philosophy*, II., p. 191, to translate *Anschauung* by *contemplation* seems inadmissible. Compare for further details of the use of the word the author's pamphlet *Kant and Spencer*, pp. 76 ff. In our forthcoming translation of Kant's *Prolegomena* we have rendered it a few times by *visualisation*, but mostly by *intuition*, and have (wherever it is not translated by "intuition") always added in parenthesis the German original.

2. Necessary *a priori* (viz., they are of universal application and transcendental, i. e., the condition of all sense-perceptions.)

3. Unique (viz., there is but one space and one time; all spaces, so called, are parts only of, or rooms in, that one space; and different times are periods of that one time).

4. Infinite (viz., all concrete objects are finite; but time and space, not being concrete entities, are limitless).

He concludes that space and time are not properties of objects as things-in-themselves, but the forms of their phenomenal existence.

It is obviously a mistake to regard space and time as concrete objects. Infinite objects would be monster-existences the reality of which cannot but pass our comprehension. They are the forms of things, indispensable not only for their existence in general but also for determining their several individual and characteristic types; for that which constitutes the difference of things, so far as science has been able to penetrate into the mysteries of being, is always due to a difference of form. Kant guardedly grants empirical reality to space and time; he ascribes space and time to things as phenomena, and denies only their being properties of things as things-in-themselves. But he adds the explicit statement that space as well as time are "the *subjective* conditions of the sensibility under which alone external intuition (*Anschauung*, i. e., sense-perception) becomes possible." Thus, Kant concludes space and time are *a priori* intuitions; they do not belong to the external domain of reality or objectivity, but to the sphere of subjectivity; and being forms of the sensibility of the intuitive mind they are (says Kant) ideal.

Kant does not deny the reality of things, but having established the ideality of space and time he believes that,

"If we regarded space and time as properties which must be found in objects as things-in-themselves, as *sine quibus non* of the possibility of their existence, and reflect on the absurdities in which we then find ourselves involved, inasmuch as we are compelled to admit the existence of two infinite things, which are nevertheless not substances, nor anything really inhering in substances, nay, to admit that they are the necessary conditions of the existence of all things, and moreover, that they must continue to exist, although all existing things were annihilated —we

cannot blame the good Berkeley for degrading bodies to mere illusory appearances. Nay, even our own existence, which would in this case depend upon the self-existent reality of such a mere nonentity as time, would necessarily be changed with it into mere appearance—an absurdity which no one has as yet been guilty of."[1]

Thus, Kant believes that if space and time were objective they would impart their ideality to the objective world and change it to mere appearance; by conceiving space and time (and in addition to the forms of our sensibility also the forms of our thinking) as purely ideal, viz., as subjective properties of the mind, he assures us that the world, our own existence included, will be saved from the general collapse which it otherwise in his opinion must suffer.

KANT AND SWEDENBORG.

The development of Kant's theory of the ideality of space and time coincides with his investigation of Swedenborg's philosophy, if that word be applicable to a world-conception which afterwards was denominated by Kant himself as "dreams of a visionary." Swedenborgians claim that Kant was influenced by Swedenborg in the formulation of his critical idealism; and Mr. Albert J. Edmunds discusses the subject in an article which appeared in the *New Church Review*, Vol. IV., No. 2, under the title: *Time and Space: Hints Given by Swedenborg to Kant*. While it appears that there is less borrowing on the part of Kant than can be made out by Swedenborg's adherents, there is more justice in the claim of Swedenborg's influence over Kant than seems to be palatable to such Kant scholars as is Professor Vaihinger. Frank Sewall, the editor of the *New Church Review*, goes over the field in an article entitled: *Kant and Swedenborg on Cognition*, in which he makes out a good case scarcely less favorable for Swedenborg than does Edmunds. The fact is that the mystical ideas on space and time which permeate religious thought had their effect on Swedenborg as much as on other thinkers, mystics as well as philosophers, and among the latter, on Kant; and certain formulations of the problem which can be found in Swedenborg, did not strike Kant as much as may appear by a mere comparison of the passages.

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[1] *Critique of Pure Reason.* Supplement VI. of 2nd edition.

Mr. Edmunds quotes the following passages from Leibnitz, on space and time:

"Since space in itself is an ideal thing like time, it must necessarily follow that space outside the world is imaginary, as even the schoolmen have acknowledged it to be. The same is the case with empty space in the world—which I still believe to be imaginary, for the reasons which I have set forth." (V. 33.)

"There is no space at all where there is no matter." (V. 62.)

"Space . . . is something ideal." (V. 104.)

"The immensity of God is independent of space, as the eternity of God is independent of time." (V. 106.)

"Had there been no creatures, space and time would only have existed in the ideas of God." (Paper IV. 41.)

Here Leibnitz uses the very word "ideal," of both space and time. Incidentally we must add that naturalists of to-day will no longer countenance Leibnitz's view of the non-existence of empty space.

There is even the religious mysticism displayed by Leibnitz which makes God independent of space and time. Swedenborg says the same about the angels:

"The angels have no idea of time. Such is the case in the world of spirits, and still more perfectly in heaven: how much more before the Lord. (*Arcana Cœlestia*, 1274.)"

It is a fact that Kant had read Swedenborg, but the coincidences as to the ideality of space and time and the theory of cognition are trivial as compared with the coincidences with former philosophers, such as Leibnitz. The truth is, we have in Swedenborg the type of a religious thinker who formulates his conception of space and time and other metaphysical doctrines in the shape of mystical allegories, after the fashion of Jacob Boehme and other religious visionaries. It is wrong on the one side to overestimate his mystical expressions, which are commonplace among authors of his ilk, and, on the other hand, to ridicule them as purely visionary, devoid of philosophical value. It is characteristic of the human mind at a certain stage of its development to formulate in mystical language philosophical conceptions which lie beyond the grasp of the intellect of that peculiar stage of growth. It is the religious

attitude of approaching philosophical problems in mystical expressions. While it is natural for a scientist to ridicule the mystic for claiming to have solved the world-problem though producing nothing but air-bubbles, it is at the same time a one-sidedness to see in mysticism nothing but wild and worthless hallucinations. Mysticism is a solution of the world-problem by sentiment, and it affords the great advantage of determining and establishing the moral attitude of its devotees. Considered as science it is absolutely worthless, considered as a guide in life its worth is determined by the spirit of which it is born. Where the religious sentiment is serious, deep, and noble, mysticism will find a poetical expression full of significance, depth, and aspiration. Kant as a religious man was attracted by Swedenborg, but when he weighed his revelations as philosophy he was so disappointed that he felt ashamed of having been caught among the credulous investigators of occult phenomena.

Swedenborg is one of the most representative mystics, and while his books may be worthless as philosophical treatises, they are not only interesting to the scientist because typical of a certain phase in the religious development of human nature, but also classical as mystical literature. The appreciation which he has found among a number of adherents proves too well how deeply his way of presenting metaphysical problems in the shape of allegorical dreams is founded in the peculiar constitution of man's spiritual system. Those who took the trouble to investigate his miracles and prophecies found that, however much might be surmised, nothing could be definitely proved, except the fact that there are people of fair and sometimes even extraordinary intelligence who have a decided inclination to believe in occult phenomena, that they, though subjectively honest, can easily become convinced of things which they are anxious to believe, and finally that in minds where a vivid imagination checks the development of critical acumen, the poetical conceptions of religious faith grow so definite and concrete as to become indistinguishable from actual life and reality.

Now, what are the lessons of the relation of mysticism to science?

We ought to consider that certain metaphysical truths (as to the nature of space, time, our mode of cognition, causation, infinity, eternity, etc.), when stated in abstract formulas, seem dry and unmeaning to unscientific minds, yet they possess a deep religious significance which finds allegorical expression in the various religious systems in myths, ceremonial institutions, and dogmas. By sensual natures who cling to the allegorical feature of the allegory, they can be appreciated only if they are expressed in a sensual way, if spiritual truths are told in parables of concrete instances as if they were material facts of the material world. It is characteristic of mystical minds to live in an atmosphere of sensual symbolism in such a way that they believe their own dreams, and their assurance makes their statement so convincing that they easily find followers among those who are kin to them in their mental constitution. As soon as a critical reader tries to verify the statements of such men, he finds himself irritated by a heap of worthless evidence, and the result is an indignation such as Kant showed after his perusal of Swedenborg's *Arcana*.

The following summarised statement of Swedenborg's world-conception is given by Kant in his *Essay on Swedenborg*, which appeared in 1766:[1]

"Each human soul has in this life its place in the spirit-world, and belongs to a certain society, which in every case is in harmony with its internal condition of truth and good, that is, of understanding and will. But the location of spirits among themselves has nothing in common with space in the material world. The soul of one man, therefore, in India can be next-door neighbor to that of another in Europe, so far as spiritual position is concerned; while those who, as to the body, live in one house, may be quite far enough distant from one another as to those [that is, spiritual] conditions. When man dies his soul does not change its place, but only perceives itself in the same wherein, with regard to other spirits, it already was in this life. Besides, although the mutual relation of spirits is not in real space, yet it has to them the appearance of space, and their relations are represented, with their accompanying conditions, as nearnesses; their differences as distances, even as the spirits themselves have not really extension, yet present to one another the appearance of a human form. In this imaginary space there is a

[1] We quote from Mr. Albert J. Edmunds' essay in the *New Church Review*, p. 261.

plenary community of spiritual natures. Swedenborg speaks with departed souls whenever he pleases, etc."

Now, if we comprehend that besides the causal connexion of things in space and time there is a logical interrelation which appertains to pure reason, we shall come to the conclusion that Swedenborg's ideas are quite legitimate, if they are but understood to be poetical and if we are permitted to conceive them in a strictly scientific sense. We read:

"The soul of one man in India can be next-door neighbor to that of another in Europe so far as spiritual position is concerned; while those who as to the body live in one house may be quite far enough distant from one another as to those (that is, spiritual) conditions."

Now, it is obvious that this sympathy of souls, which is not according to space and time, but according to spiritual kinship, is quite legitimate and very important to those who understand it. The sensual man will find difficulty in grasping its significance, except that it be stated to him in a sensual way. Obviously, it is true that "spirits themselves have not really extension." Their interrelation is of a different kind. But if we imagine them, as Swedenborg does, "to present to one another the appearance of a human form," we conceive of their existence as though it were in space, another kind of space than that filled by matter, and "in this imaginary space there is a plenary community of spiritual natures." Thus logicians represent the interrelation between genus and species by geometrical figure, the one including the other.

Swedenborg is simply a man whose imagination is so vivid and whose scientific criticism is so little developed that the imaginary space invented to represent the interrelations of spiritual realities which are in neither space nor time, becomes an actual space to him; his spirits become materialised shapes, and thus it happens that he can speak "with departed souls whenever he pleases." A scientist too, a historian or a naturalist, can consult the wisdom of the departed spirits. He can make himself acquainted with the views of Newton, of Goethe, of Kant; he can incorporate their souls in his own being, but being of a critical nature, he will not see them as bodily shapes. It is characteristic of mystics that their

imagination outruns their sobriety, and thus the flights of their fancy become real to them.

While it is not impossible that Swedenborg became the fulcrum on which Kant elaborated his metaphysics, we may at the same time justify the opposite statement that Kant's relation to Swedenborg is purely incidental and without significance. The elaboration of his theories as to space and time and cognition, Kant made at the time when he read Swedenborg's works, but we must be aware of the fact that Kant was familiar with mystic views in general, and Swedenborg's expressions did not strike him as much as it might appear to those who compare Swedenborg and Kant only, but have no reference to Leibnitz and other thinkers. Certainly, Kant would have come to the same conclusion if he had dealt with any other thinker of a similar type, Jacob Boehme, or even spirits on a lower level in the line of mysticism.

While Kant's statements show a certain resemblance to those of Swedenborg, we find that their agreement with Leibnitz (a philosopher whom both Immanuels, the great mystic as well as the great critic, had studied carefully) is much closer. We shall at the same time understand why Kant exhibited a decided contempt and scorn for the dreamy haziness of these visionaries, which, when dealing with scientific problems, is sterile and unprofitable. In contrasting the philosophical study of metaphysics with those vague fancies of religio-philosophical dreams, Kant compared the latter to the intangible shade of a departed spirit, quoting Virgil's well-known verses where Æneas in the under-world tries to embrace the soul of his departed father, Anchises.[1] Kant says:

"Metaphysics, with whom it is my destiny to be in love, offers two advantages, although I have but seldom been favored by her: the first is, to solve the problems which the investigating mind raises when it is on the track of the more hidden properties of things through reason. But here the result very frequently deceives hope, and has also in this case escaped our longing hands.

"Ter frustra comprensa manus effugit imago,
Par levibus ventis volucrique simillima somno."—(VIRGIL.)

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[1] Æneas, Book VI., Verses 701–702.

[Thrice I tried to embrace and thrice it escaped me, the image,
Airy and light as the wind, and to volatile dreams to be likened.]

KANT'S ANTINOMIES.

After this digression we revert to Kant's idealism and will now point out the result to which it leads.

Kant, as we have seen, protests against being an idealist in the sense that the reality of the external world of objects or things be denied. His idealism insists only on the ideality of space and time; and by ideality he understands subjectivity. But together with time and space all our forms of thought are assumed to be purely ideal. Hence there is a rift rending asunder form and substance, thought and reality, representative image or phenomenon and the represented objects. We know phenomena, not noumena. Things in themselves are unknowable, for the laws of pure form have reference to appearances only.

If purely formal thought has no objective value, it can be used merely to decide problems that lie within the range of experience —the domain of appearance; but things in themselves, the domain of transcendent existence, lies without the pale of any possible knowledge.

Kant's method of dealing with these subjects is peculiar. He neither leaves them alone nor solves them, but formulates the affirmations as well as the negations of a series of contradictory statements in what he calls "the antinomies." Here the weakness of Kant's philosophy comes out, indicating that there must be a flaw in it somewhere.

It is interesting to notice that as to Kant's Antinomies of Pure Reason the great Königsberg philosopher has been anticipated by Buddhism in which (according to Neumann's *Reden Gautamo's*, Vol. II., No. 60) the antinomies are taught in a similar, partly literally in the same, form. But there, too, the contradiction belongs to the formulation of the statement of facts, not to the facts themselves.

In a certain sense we can say, the world must have had a beginning, and must come to an end; and the world had no begin-

ning and can have no end. If we speak of this definite nebular system of stars comprising the entire milky way we are compelled to admit that it began and will at some definite though distant future be dissolved again; but if we mean by world the totality of existence in all its shapes, prior forms and causes of origin, we must own that it has existed and ever will exist. We could go back in thought to the time before the present cosmos started, when other worlds were evolving or dissolving and a different kind of universe or condition of things prevailed and so on without coming to an end. But these conditions being the causes of the present world are included in our concept of the universe. The antinomies are due to the equivocal significance of our words, not to a fault of reason; nor do they indicate that existence itself is self-contradictory. The contradiction is not in the things but in our conception of things.[1]

Schopenhauer has vigorously attacked Kant on account of his antinomies, insinuating weakness and hypocrisy. But it seems to us, while by no means agreeing with Kant on this particular point, that granting his premises his conclusion was justified. The four points of the antinomies, viz., the eternity and infinite divisibility of the world, the contrast of freedom to causation and the existence of God, are no longer of a purely formal nature; some notions of experience are inevitably mixed up in them, and thus pure reason is unable to decide either way. We might as well try to determine by *a priori* considerations as to whether or not electricity can be produced by friction, or whether or not by rubbing an old metal

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[1] That the antinomies cannot be regarded as true antinomies or contradictions of reason, but as the result of a misconception and lack of clearness in our formulation of the several problems, becomes apparent in the antinomy of freedom *versus* necessity. Kant's definition of freedom (§ 53) as a faculty of starting a chain of events spontaneously without antecedent causes and his way of reconciling freedom and nature (or as we would say "determinism") is subject to serious criticism. Compare the author's solution of the problem in *Fundamental Problems*, pp. 191–196; *Ethical Problems*, pp. 45–50, 152–156; *Primer of Philosophy*, pp. 159–164; *Soul of Man*, pp. 389–397. See also *The Monist*, Vol. III., pp. 611 ff., "The Future in Mental Causation." Concerning the *ought* and its assumed mysterious nature compare the chapters "The *Is* and the *Ought*," and "An Analysis of the Moral *Ought*," in *The Ethical Problem*, pp. 279–295.

lamp the genii of the lamp will appear. Hence, before the tribunal of pure reason either side, the affirmative as well as the negative, is defensible, and thus we should be obliged to settle the question with other methods; other methods, however, according to Kant's notions concerning the nature of metaphysical questions, would not be admissible, because he insists that all metaphysical notions must be derived from pure concepts alone.[1]

EDITOR.

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[1] A critical examination of Kant's philosophy we reserve for the second part of our discussion which will appear in the next number of *The Monist* under the title "Kant's Philosophy Critically Examined."

LITERARY CORRESPONDENCE.

FRANCE.

M. G. E. ALAUX, one of our most distinguished philosophers, whose zeal and convictions age has not weakened, has undertaken to sum up in a little volume entitled *Dieu et le monde, Essai de philosophie première* his views on metaphysics, which have taken here a very precise and distinct form. In some respects his doctrine would seem to be an expression of the Christian faith, or more precisely the reasoned justification of the fundamental dogma of the Trinity. It is evident, however, that he offers us things new and important, both as to methods of reasoning and as to doctrines and theories proper, touching, for example, the problems of liberty, of evil, and especially of moral sanction, which finds its individual guarantee in the succession of existences.

The work of M. Alaux is concerned with the critique of the contradictory ideas of our reason: the affirmations arise here in some sort from the interplay of contraries. It would be impossible for me to present even a fragment of his doctrine without running the risk of disfiguring it. The devotees of metaphysics will find here much to interest them; while as for myself, I am far from being indifferent to these efforts of the human mind, which is always bent on surmounting the difficulties which it has encountered time out of mind. I can nevertheless not refrain from making one general criticism: my objection is that, penetrating as our dialectic may be, it always leaves it for us to say what our concepts really represent,—what the symbols which enter our system represent. The change of our states of consciousness is the condition of feeling;

the opposition of terms is the condition of logic. But what can be deduced from this two-fold necessity?

I see no way, I wrote recently, of resolving or eliminating these antinomies, which are always present,—the antinomies of the absolute and the relative, of the infinite and the finite, of the one and the many, etc., or in another sphere, pleasure and pain, good and evil, etc.,—save by considering them as simple attitudes of our mind. They correspond to our manner of understanding and feeling; they are the forms of our affective and of our mental life, the states by which we become conscious of our relations with the exterior world. Is it not creating factitious contradictions to relegate outside ourselves these conditions of knowledge and sensibility? I admit, of course, that we cannot either efface from things the mark of our own mind, or subject to doubt the necessary conformity of our organisation with the regular order of things,—a conformity of the reality of which we have the soundest assurance. But it is right here that the true problem lies, and we should be on our guard lest we deceive ourselves regarding the value of the logical artifices by means of which we explain the universe.

M. Alaux will pardon me for the exceptions that I here take; they do not prevent me from holding his work in high esteem, and they are certainly not designed to erect any obstacles to research on the great highways of metaphysical research.

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M. E. Murisier, in *Les maladies du sentiment religieux*, offers us a study which has both novelty and interest. With a view to reaching a more precise definition of religious sentiment, he proposes to analyse the pathological forms of this sentiment. One of these forms is ecstasy; the other is fanaticism. Ecstasy, the last stage of the mystical tendency, corresponds to a self-introversion of the individual who wishes to enter into direct communication with his God; while, contrariwise, fanaticism means an expansion beyond, with the object of imposing upon others the faith which one has in one's heart. In both cases we have to do with diseased persons who are suffering from organic, affective, and intellectual maladies, and incapable of all and every synthetic effort to adapt

themselves to their environment. They seek relief for their conditions of non-accommodation in contradictory ways: the former annihilate their own tendencies, which they are unsuccessful in coordinating; the latter endeavor to shape the social environment to conform to their personal standard. The ecstatic subject reveals two essential characteristics of normal piety: (1) the need of direction; (2) the imitation of a model. This subjective state, this longing for renunciation in ecstatics, gives us the true meaning of the *Imitation of Jesus Christ.* It informs us concerning the eternal tendencies to which religion answers.

Fanaticism instructs us rather regarding its social rôle. A supernatural power guarantees for the religious man the regularity and permanence of his environment, which naturally changes; it is the tranquillity and happiness of the feeble being which finds itself assured in its old adaptations, and altogether free from the necessity of new adaptations.

Religion, in fine, maintains the social unity and stability: absolute in fanaticism, this unity and this stability remain relative in the normal religious forms. Thus, religion is not expressly either an interior life, as the theorists of individualism would have it, nor a pure manifestation of the collective consciousness, as the sociological school believe. The individual form, M. Murisier thinks, is not derived from the collective form: the internal tendencies to unification rather determine and support the tendency toward social unification, which serves them most actively.

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By the side of the two works last mentioned a place is deserving for the brief and excellent little book of M. Henri Berr, *Peut on refaire l'unité morale de la France?*[1] Although this work treats especially of France, its interest is nevertheless more far-reaching inasmuch as the condition of minds in every country is almost the same; I refer to the conflict, whether apparent or real, between science and faith. The special feature about France is the peculiar course which the combatants have adopted, together with a pecu-

[1] A. Colin, publisher. The other works are published by F. Alcan.

liar combination of circumstances resulting from a different historical evolution.

M. Berr defines religious faith as "a conception of things which, imposing itself on the mind, is transformed into principles of action, regulates the relations existing between men and between men and the universe." "Faith," he writes again, "is the affirmation more or less conscious of the unity of the being affirming it, the theoretical provisional explanation of that unity, and in conduct the application of that theory."

Can the explanation of Being be rendered more conformable to truth,—can theology be replaced by scientific philosophy? This is tantamount to asking whether or not progress is taking place in human thought. M. Berr does not hesitate to answer in the affirmative. Progress consists, according to him, in overturning the obstacles which separate the subject from the object, in unifying them: and this is monism,—a monism which is neither materialistic nor spiritualistic. The identity of subject and object as an hypothesis is in his eyes a conquest forever; the unity of essence is a permissible conjecture.

Another point gained is that science alone is the organum, the instrument for the resolution of philosophical problems. But how can science lead us to the assimilation of the ego and the non-ego? Here we find again in a condensed form the doctrine set forth some time ago by M. Berr in his work *L'avenir de la science*, to revert to which would in this place take up too much of our time. I shall merely recall that science, according to M. Berr, is the spontaneous application of the ego to the non-ego: our point of support for understanding Being is the ego; in the ego the reality resides, one and unifying. Psychology offers us the type and the means of the union sought. Science finally as synthesis has all the characters of religious faith. It cannot extinguish faith; it tacitly implies and justifies it. It is revelation,—the revelation of the truth; it is faith, belief in the possibility of knowing the truth. Humanity, in sum, has lived upon an hypothesis which has been liberated and proved by science and which is therefore in science as much as it is in religion.

M. E. Fournière, in his *Essai sur l'individualisme*, submits to exact scrutiny the established opposition between individualism and socialism, an opposition which he denies exists. In order to resolve this opposition, he shows first that the individual is the result of the social co-operation, which will not be contested, though it also must not be denied that the individual is still the indispensable prime agent. He believes himself justified in concluding, thereupon, that socialism, "co-operation extended to all individuals," is the realisation of individualism. He defines it as a state of things where the state becomes the means of general voluntary co-operation, the regulator of combination, the agent of transformation of monopolies for the benefit of the whole.

But how is the state to be this means? By the hand of whom, by the authority of whom? How can socialism, thus defined, be really a medium to liberty? How can co-operation extended to all be voluntary at the same time? To whom shall this universal co-operation extend? What shall it embrace? What reservations shall it make? These are questions that must be taken up successively, for some laws are not true save within certain limits.

Undoubtedly, M. Fournière has made a skilful plea, full of strength and ardor, and supported by arguments of which the apparent precision does not always hide the subtle and delusive character. The author often yields to immediate preoccupation, the echo of recent struggles in our assemblies. If he is a politician who seeks justly to lift himself to the plane of his theory, he is also a theorist who is disturbed by politics. He gives way to that tendency of the revolutionary spirit which would suppress by violence realities which are unpleasant, which disdains partial solutions, the only ones which are efficacious and durable, and is bent upon accomplishing by a fiat the simultaneous variation of all social phenomena. M. Fournière has too much intelligence not to see certain things which he does not say. He would gain much in force by saying them.

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One may consult with profit the book of M. G. Palante, *Précis de sociologie*. Essays of this kind are apt to render good service

in the present state of this science, a state of such incoherence that the sociologists cannot even come to an agreement regarding the definition of the social datum or the thing which is the true subject-matter of psychology; and consequently regarding the method which is best suited to their researches. M. Palante sides with the psychological school. I have indicated several times the reasons which separate me from this school, but I am always curious to learn of new arguments to be advanced in its favor, my only solicitude being to see more clearly into these difficult questions. M. Palante does not convince me, and it does not seem to me that his study will dissipate the misunderstandings which divide writers in this field. The majority, I believe, persist in understanding by sociology something different from psychology, or even from "inter-psychology," to use the latest expression of M. Tarde. The psychological processes are one thing, the sociological products are another; and results realised in time—economical, juridical, political, religious, and other institutions—are with respect to their causes (the psychological agents) specific facts of existence which deserve special study. The history of property, for example, shows us facts which have their significance independent of the particular and personal situations that encompass them.

How are societies formed? How preserved? How do they develop? How do they disintegrate and die?—such, after the introduction, are the four divisions of this volume. Under these titles, the author examines the different factors or laws which have been advanced,—factors and laws relating to race, environment, population, mentality, etc. He performs his task with clearness and attractiveness.

A great admirer of Nietzsche, M. Palante is not, like the latter philosopher, inclined to theories of socialism: he declares emphatically that the inequality of individuals will never disappear, and it is sufficient to recognise this truth to remain proof against all social, pedagogical, and other systems which are based upon what I should term the sophisms of inequality.

The present volume of the *Année sociologique* (1890–1900) embraces in addition to numerous notices of books, which as usual are well classified, three original studies which take up more than 100 pages: one by M. Bouglé, *Remarques sur le régime des castes*; another by M. Durkheim, *Deux lois de l'évolution pénale*; and a third by M. Charmont, *Les causes d'extinction de la propriété corporative*. I cannot even think of giving here a *résumé* of these three important memoirs, and I shall also restrict myself to mere mention of four studies which make up the contents of the *Année philosophique* for 1900; viz.: (1) an essay by M. V. Brochard, *Les mythes dans la philosophie de Platon*; (2) an essay by M. O. Hamelin, *Sur une des origines de Spinozisme*; (3) an essay by M. L. Dauriac, *Essai sur les catégories*; and (4) a paper by M. F. Pillon, *La critique de Bayle, critique du spiritualisme cartesien*.

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In the department of history I have to note from the pen of M. Elie Halévy a work in two large volumes, which under the common title of *La formation du radicalisme philosophique* gives us (1) *La jeunesse de Bentham*, and (2) *L'évolution de la doctrine utilitaire de 1789 à 1815*. A third volume is to appear which shall furnish a picture of Benthamism, or "philosophical radicalism," in the final period of its development, from 1815 to 1832.

M. Halévy has endeavored to exhibit the doctrine of Bentham in its true form; that is to say, as an integral, social, juridical, economical, and constitutional doctrine, having as its foundation the principle of utility, which is itself based upon a certain psychology. First he shows us Bentham as a disciple of Helvetius, Beccaria, and Adam Smith. Then, he endeavors to ascertain how, under the pressure of general causes and the influence of James Mill, Bentham became the theorist of the radical party, and how in his own disciple, Ricardo, the theories of Malthus came to be combined with the ideas of Adam Smith.

One can imagine the interest of a study, supported by copious materials, of so important an epoch, and of a man who has had so great an influence upon the general life of the English people. For, one catches glimpses in this volume of many other features, and of

many other important events; and certainly there have been few periods in history where thought has been so active and so intimately interwoven with the public life.

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We will now go backward more than a century with M. H. Joly and M. Ad. Hatzfeld, who have respectively contributed volumes on *Malebranche* and *Pascal.* M. Joly's *Malebranche* is a very readable book, as one might have expected from a writer of his ability. He has given us in his work a study of Malebranche the man and his environment, and of Malebranche the metaphysician, the philosophical theologian, the psychologist, and the moralist. He finds in the doctrine of the illustrious Oratorian a pure type of the constructive philosophy, much more so than even in that of Spinoza. He defends it against the objections which have been levelled against it, as being on the one hand too mechanical and on the other too mystical. He believes, in fine, that if Malebranche could live again in our time he would applaud the progress which our sciences have made, as well as the researches of contemporary physiological psychology; he would see in them the natural sequence of his own thoughts, and would only say that science properly so called does not dispense even now with metaphysics, and that the latter has been unable to destroy religion.

Not less interesting is the *Pascal* of M. Hatzfeld. The volume begins with a psychological biography. The discussion of Pascal's scientific labors has been confided to Lieutenant Perrier, who has every qualification to treat it properly. So attractive is the figure of Pascal, as well by his misfortunes as by his genius, that our curiosity never tires in studying him and penetrating to the depth of his thought.

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M. S. Karppe, with his *Étude sur les origines et la nature du Zohar, précédée d'une étude sur l'histoire de la Kabbale,* carries us back to the sources of "Jewish mysticism" among the peoples of Egypt and Chaldea. I could not think of giving a complete idea of this learned and fascinating work, which contains not less than 600

pages. It will be received with all the more favor, as works dealing with the philosophy of the Orient are comparatively rare, especially in France; and since we have here a characteristic aspect of Oriental thought, which has percolated through the intellectual soil of the Occident by many different ways.

M. Karppe distinguishes between Jewish mysticism and the Cabala; he does not include in the Cabala all Jewish mysticism. He seeks to avoid confounding, in a word, genuine Jewish mysticism as it appears in its origin and in the first period of its development, with the later mysticism as it was shaped in the post-Talmudic epoch and in the Middle Ages. The Bible, he remarks, is the very opposite of a mystical book; but the Bible is not the adequate expression of the Biblical epoch, and we must also take into account the ideas which were anterior to it. Jewish mysticism, moreover, is quite different from the ordinary mysticism. It does not mean a revolt of faith against reason, but on the contrary a revenge of reason upon faith; the Jewish mind took refuge in mysticism under the constraint of a rigorous monotheism, in order to save its instinct of scientific curiosity. We thus see it extending to all objects of thought and waxing great on the most heterogeneous doctrines, Babylonian folklore, reflexions of Greek philosophy, Christian scholasticism, Arabic scholasticism, the superstitions of the Middle Ages,—yet always with the endeavor of conforming to the Bible, to which the mystics attributed an esoteric meaning. It became the vehicle of free speculation developing alongside of dogmatism and in opposition to it. "Almost invisible in Biblical times, it slumbered in the Talmudic epoch and saw the full light of day in the epoch of the gaonim; it shone with its greatest splendor from the tenth to the thirteenth centuries. But it remained always at the margin of the official doctrine which beginning with the Bible extends to the Talmud, from the Talmud to the Saadia, from the Saadia to Maimonides, from Maimonides to Mendelssohn."

As to the Cabala, of which the origin does not go back beyond Isaac the Blind, it is said to have proceeded directly from the opposition between Aristotelian and Maimonidean rationalism. The Zohar, a sort of bible of the Cabalists, a confused and composite

work, according to the theory of M. Karppe, belongs to a relatively modern epoch.

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A manuscript left by the late M. Challemel-Lacour, former president of the Senate, has just been published under the title of *Études et réflexions d'un pessimiste.*[1] M. Challemel-Lacour, who was a philosopher as well as a statesman, has given us in these pages in humorous form his thoughts concerning life and its disillusionments. Melancholy is here sharpened with irony, and paradox gives a zest to truth. Many fine sketches and rapid portraits here pass before our eyes: Leopardi, Shakespeare, Shelley, Byron, Swift, Pascal, Chamfort, and Heinrich Heine! The volume closes with a special study of Schopenhauer, before published in a slightly different form in the *Revue de Deux-Mondes*, but not yet bereft of interest.

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M. Jean Bourdeau, in his *L'évolution du socialisme*, gives us a very interesting page of contemporary history,—the history of socialistic doings and ideas in France in their application to politics and legislation, to communal administration, to industry, and to farm labor. M. Bourdeau shows us how greatly socialism has changed in this century and how complex its doctrines are; his study is interesting and instructive.

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It remains to announce the publication of the *Proceedings and Papers of the Fourth International Congress of Psychology*, held at Paris in August, 1900. This publication, of which M. P. Janet, general secretary of the Congress, was the editor, forms an important volume of 800 pages, containing more than 130 communications published in full or in extracts, as well as the discussions to which they gave rise. Good indices conclude the volume and facilitate reference.

I shall finally call attention to the *Revue de psychologie clinique*

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[1] Paris: Fasquelle, publisher (Bibl. Charpentier).

et thérapeutique, edited by Drs. P. HARTENBERG and H. AIMÉ.[1] This monthly review, which has already reached its fifth year, is of moderate size but contains good and admirably chosen contributions. Its object is precise, its execution clear. It is proposed to utilise here the data furnished by science of the functions of the brain, for the purpose of treating nervous disorders of all kinds (affections of the spinal cord and psychoses properly so called excluded); in other words, to apply psychology to medicine. The interest of this enterprise for the physician, and no less for the psychologist, may be imagined.

LUCIEN ARRÉAT.

PARIS.

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[1] Paris, 64 rue de Montceau (VIII[e]).

DISCUSSIONS.

PROFESSOR GILES'S HISTORY OF CHINESE LITERATURE.

Professor Giles's *History of Chinese Literature*[1] is a seasonable contribution to the Western knowledge of China, which politically, commercially, and socially is at present the center of universal interest. The book will doubtless serve to dispel to a certain extent the popular misconceptions of those who see nothing in the Chinese nation but savages and degenerates. The book has every element in it calculated to make it popular among readers of liberal culture: the style is lucid, the subject is interesting, the translations are fluent and reproduce the sense fairly well, for it must be admitted that it is all but impossible to translate Chinese poetry into any other language without sacrificing the beauty peculiar to the Chinese,—that inimitable brevity which expresses so much in a few monosyllables.

While the book is important and the subject treated in a popular and attractive style, we regret to find fault with the author for several shortcomings which detract from the usefulness of the work. As a first attempt in English the book is welcome, but its value cannot as yet be measured by strict rules of scholarship. It is a great pity that Professor Giles is extremely one-sided, and the general public is apt to take his unwarranted statements as authoritative. I will not dwell here on the irritating tone of the author's style that is most dogmatic and positive where his statements are least reliable, but limit my criticism to the lack of system as well as the irregularity of treatment. Matters of insignificance fill several pages at the expense of things important. The book is not a history, but merely a haphazard collection from the author's Chinese scrap-books, compiled with some attempt at chronological arrangement.

Professor Giles grants that the work "would be inadequate to the requirements of a native public," but it is insufficient even "as an introduction into the great field which lies beyond." It is impossible to indulge in a minute criticism of the book, but a few remarks will serve to explain my objections.

Confucius, as rightly observed by Professor Giles, marks the beginning of Chinese literature, and it is very proper to open its history with an account of the

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[1] New York: D. Appleton & Co.

Five Classics and the Four Books, both from the Confucian and a general point of view. Next to this Taoism ranks in importance, and this is also justly recognised by Professor Giles. Indeed, these two great currents of ethico-philosophical thought run through all the veins of Chinese literature. But other currents of thought are not wanting, although they have unfortunately not attained a favorable development. Such are the school of Kuan Chung, Shang Yang, Shên Pu Hai, and Han Fei (commonly called the *Fa Chia*, i. e., the jurist school); the school of Kung Sun Lung and Yin Wên (commonly called the *Ming Chia*, i. e., logicians); the school of Sun Wu, Wu Ch'i, Wei Liao (commonly called the *Ping Chia*, i. e., the military writers); and the school of eclectics, such as Têng Hsi, Shên Tao, etc. Some of the words ascribed to these thinkers are spurious, but there are enough genuine productions to reflect the thoughts and sentiments displayed in early Chinese literature. Professor Giles should have mentioned these names in his chapter on "miscellaneous writers," as he might classify them. He disposes of them in too easy a fashion by summarily condemning them as "gross forgeries," but he is liberal enough to cite stories from the *Ping Fa* (a military work), and the *T'an Kung*, an author of doubtful significance. He refers to such apocryphal works as the *Chia Yü*, and to minor authors such as *Lü Shih Ch'un Ch'iu*, and *Mu T'ien Tzŭ Chuan*, while he omits entirely *Yen Tzŭ Ch'un Ch'iu*, *Kuei Ku Tzŭ*, *Têng Hsi Tzŭ*, etc. He may believe that some of them deserve to be left out, but he ought not to have associated Mo Ti and Yang Chu with Mencius, mentioning their doctrines only incidentally. Mo Tí and Yang Chu, the former an extreme altruist, the latter no less extreme an egoist, both very prominent since the time of Confucius, have surely a right of being ranked as original thinkers. The way in which Professor Giles mentions them gives the impression that our author knows their names only through quotations of Mencius.

Further, still speaking of the "ante-Ch'in literature," viz., the first period till the first emperor of the Ch'in dynasty ordered all the books to be burned in the year 13 B. C., Professor Giles classifies Hsün Tzu as a miscellaneous writer and Han Fei Tzu as a Taoist. Hsün Tzu, however, who like Mencius was an ardent follower of Confucius, cannot be said to have been "directly opposed to the Confucian doctrine," simply because he called human nature bad,—a subject on which Confucius proclaimed no definite opinion. Han Fei belonged to the independent "school of jurists." His comments on Lao Tzu do not justify our calling him a Taoist, Taoism being better represented by Lieh Tzu and Chuang Tzu.

In the Han literature, Professor Giles gives such a prominent position to the letter of Li Ling to Su Wu as to fill several pages with its full English translation. This is altogether unjustified. Professor Giles seems to think that there were no other literary productions of equal merit and significance during the whole Han dynasty. The episode of Li Ling is pathetic enough, but is it really worth while to sacrifice so many pages for it in a history of Chinese literature consisting only of 438 small octavo pages in large type? Why did he not fill these pages with

more instructive information as to the literary activity of the Han dynasty? Above all, he should have mentioned the works of Liu Chia, Chia Y, T'ung Chung Shu, and others.

Liu Chia was a literary guest of the first emperor of the Hans and occasionally gave lectures to the royal audience on Chinese classics. The emperor, in whom the martial spirit of his victorious conquests had not yet become extinct, turned his back upon everything literary and used to exclaim: "I have acquired my empire on horseback, and what need have I for literature?" Liu Chia, however, retorted, saying: "True, you have acquired your empire on horseback, but would it be possible also to administer it on horseback?" He then dedicated to the emperor a book called *Hsin Yü* in twelve volumes, explaining the causes of the rise and decline of the ancient empires. This is the first literary monument of the Han dynasty, which was soon followed by many others.

Chia Y was one of the ablest and most scholarly high officials under Emperor Wên. The emperor was very anxious to give him an important and responsible position which would enable him to exercise full power in matters of civil and educational reform. But rivals impugned him, finally inducing the emperor to exile him from court. Chia Y never regained the emperor's favor. He died very young, at the age of thirty-three. His writings, called the *Hsin Shu*, in ten volumes, are among the best literary specimens of the age. Professor Giles cannot make any excuse for omitting his name, while he speaks of Ch'ao Ts'o whose literary talent is not equal to Chia Y's.

T'ung Ch'ung Shu, a rather intolerant Confucian, flourished under the reign of Emperor Wu. He did a great deal for the cause of Confucianism, inducing the emperor to establish colleges, to encourage the study of orthodox classics, and to put the principles of Confucian ethics into practice. He must be counted as one of the factors of the literary activity under the Han. The *Ch'un Ch'iu Fan Lou* is the title of his writings.

If Professor Giles's work should be called a history, and not an anthology of Chinese literature, he ought to have explained, for example, the revival of literature under the Hans from the general devastation that followed the literary *coup d'état* of the First Emperor of Ch'in, and recorded the names of those who composed the galaxy of men of letters in those days. The enumeration of unimportant names and the reproduction of ill-chosen samples of their writings can never make a history.

With the downfall of the Hans there followed several short-lived dynasties, first the Three Kingdoms, then a temporary unification by the Chin dynasty, and then another state of universal anarchy in which one struggling kingdom fell after another, terminating with the ascendency of the Sui dynasty, which, however, soon again gave way to the rising power of the T'angs. These prolonged civil and political disturbances, covering the space of more than four hundred years, created chances favorable to a display of strong characters, and so it is not accidental that

in this period we find the best military and political geniuses. The literary life of China, however, suffered immensely and was at its lowest ebb. Any sustained powers of speculation and reflexion were then things unknown. True, the Buddhist scholars who came from India and their native followers were by no means swept away by the waves of worldly vicissitudes, but calmly went on translating their sacred canons and adding thereto some original treatises in the spirit of their religion. But the native pundits, either Confucians or Taoists, could not emancipate themselves from the political tendency of the time. Their sole aim in life consisted in attaining to power and applying the doctrines of their masters. Whenever they succeeded, they invariably asserted their practical optimism and spared no pains in eulogising the virtues of the reigning emperor in verse as well as in prose. But as soon as fate turned against them, or when their advice remained unheeded, they fled to the mountains or the woods, where free from worldly care and formalism they sought oblivion in drinking and consolation in the Taoistic doctrine of *laissez-faire*, delighting in the title "Yin chün tzu," i. e., sages in seclusion. This will partially explain the fact that there were in those days so many "drunkard-hermits," and among them some "drunkard-poet-hermits" of great genius. Their drink was *chiu*, i. e., rice-wine, the good qualities of which are highly appreciated and praised in song.

By the way, the *chiu*-drinking habit of the Chinese poets seems to have left a permanent effect on the rhymers of succeeding generations, for the *chiu*-drinking capacity as it seems to us has ever since been considered an almost indispensable accomplishment of Chinese poets, for poets, even if sober by nature, as a rule pretend to be drunkards. Most of the finest literary productions of this period came from the pens of these wine-bibbers. Students of Chinese literature who wish to know more about them should consult for collections of poetical and prose works, the *Wên Hsüan*, and the *Han Wei Liu Chao Y Pai San Chia Chi;* for critical works, the *Yü Tai Hsin Yung*, the *Wên Hsin Tiao Lung*, the *Shih P'in*, and the *Wên Chang Yüan Chi.*

I do not intend to follow Professor Giles further in the details of his Chinese literature, and will only add a few comments on omissions which affect the general plan of the book.

A most lamentable defect in Professor Giles's *History of Chinese Literature* is his omission of the literature of Buddhism and its influence on the Chinese mind in general. Confucians from their partisan standpoint hesitate to recognise its significance and think that Confucianism has been the sole factor in their national life and that it covers everything worth mentioning in the whole bulk of their literature. The incorrectness of this statement, however, will be apparent to every impartial observer of Chinese culture. We cannot fail to notice how deeply Buddhism with its rich vocabulary, with its dialectic subtlety, with its inexhaustible imagination, and lastly with its noble sentiments, has influenced the literature of the Middle Kingdom from the time of its introduction down to the present day. The few

pages on Fa Hsian, the author of *The Record of the Buddha Country*, Kumârajîva, a translator of Buddhist sûtras, Bodhidharma, the founder of the Ch'an sect, Hsüan Tsang, the author of the *Records of Western Kingdoms*, and some other Buddhists, by no means do justice to the literary merits of Buddhism in China.

First of all, Kumârajîva's translation of several hundred important Buddhist sûtras and shâstras must be considered a monumental work in the history of Chinese literature. Before his advent China was not deficient in Sanskrit translators both native and foreign, but it was not till Kumârajîva had finished his gigantic task that Chinese Buddhist phraseology began to be permanently settled and assimilated into the body of native literature. One can well imagine what difficulties beset the work of the translator who had to do with a language lamentably poor in religious and philosophical terms and grammatically inflexible in the highest degree. He had to coin a number of new words, and, in case this was impossible, to retain the original terms transcribed in Chinese characters. Such are, e. g., *Bodhi*, *Prajñâ*, *Buddha*, *Sangha*, *Yâma*, *Mâra*, *Deva*, etc., etc.

Buddhists from India did not import their religion only, but also their literature. They did not translate Buddhist sûtras only, but also other miscellaneous works. And the latter have also left impressions on the unsystematical Chinese mind. Shên Yüeh's *Book of Four Tones* is an example. The work is considered by Chinese scholars to be a standard authority of its kind, but its fundamental principles are nothing else than a modified application of the Sanskrit *Subdavidyâ*, the science of sounds. It is strange that Professor Giles does not attach any importance to this book, though he mentions it in a cursory way—a work which was at any rate the first attempt to formulate the Chinese phonography.

The oldest literary monument left by Buddhists is the *Hung Ming Chi* by Shih Sêng Yu of the Liang dynasty. The *Hung Ming Chi*[1] is a collection of Buddhist writings from the earliest period down to the author's own time. Confucianists as a rule do not condescend to recognise the merit of their rivals, yet the compilers of the *General Catalogue of the Four Imperial Libraries* were liberal enough to mention it on the ground that the collection is "at all events superior to those compiled by commonplace followers of Buddha," and the writings are "elegant and finished."

The most pronounced and recognisable influence of Buddhism, however, was not felt until the rise of the T'ang and the Sung dynasties. In these times Buddhism wielded its full power over every phase of Chinese life, and even most antagonistic adherents of Confucius could not but feel it. In the beginning of the T'angs, Hsüan Tsang came back from his long Indian pilgrimage, bringing with him a large number of Buddhist books in Sanskrit. Encouraged by the hearty reception that was given him by Emperor Hsüan Sung, he at once began his work of translation together with his associates, which is known to Buddhists scholars

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[1] Literally, Great Enlightenment Collection.

as the "New Translation," in contradistinction to Kumârajîva's "Old Translation." The New Translation shows the traces of improvement in many points on the Old Translation; it is more faithful, more accurate, more literal, although it reads more like Sanskrit than like Chinese. This must be considered as quite a revolutionary event in Chinese style and taste. And a complete assimilation of this alien element into the Chinese literary life-blood required considerable time, which was finally accomplished when the Ch'an sect (Dhyâna School) eclipsed all other Buddhist schools in its influence and propagation during the T'ang dynasty.

The Chinese seem not to have any inclination for elaborate and systematic speculation. Such a complicated and highly abstract system as the philosophy of the Tien Tai, or the Avatamsaka, or the Dharmalaksha school of Buddhism could not take a permanent hold on the Chinese intellect. So these schools exercised only a transitory influence. It was the more practical Ch'an sect that deeply affected the imaginative chords of Chinese men of letters.

The Ch'an sect produced so many great characters throughout the reign of the T'ang and the Sung dynasties that their spiritual influence was felt all over the Middle Kingdom by the learned as well as the unlearned. Even to-day we have many great Buddhist temples in China established by its devotees, though at present Buddhism is declining. These leaders of the sect composed many peculiar literary productions, in prose as well as in verse, as the result of a perfect amalgamation of Buddhist ideas with the Chinese temper. The typical verse of the Ch'an sect is called *Ch'i* or *Ch'i Sung*, a Chinese substitute for Sanskrit *gâtha*. Its form is generally seven or five metres in four lines like the ordinary Chinese *Chüeh Chü*. It embodies religio-philosophical feelings under a poetic garb, but it is not a religious poem or hymn as popularly understood by Christians, for it does not adore nor praise nor ask benediction. It has peculiarities of its own in diction as well as in sentiment, and unless the reader himself goes through all the mystic spiritual experiences of the Mahâyâna Buddhism, he will be unable to detect in it the religious aspirations which it nevertheless contains.

Almost all eminent prose writers of the Ch'an sect left their *yü lu*, "collection of sayings," which are written in a peculiar style so distinct from any classical or profane literature that we have to classify them by themselves. The most representative works of this class are the *Lu Tsou T'an Ching* (Sermons of the Sixth Patriarch) by Hui Nêng, the sixth patriarch of the Ch'an sect, and the *Lin Chi Lu*, the writings of Lin Chi, founder of the Lin Chi school. These works belong to the earliest productions of the Ch'an literature. They form a beginning only, for prose as well as poetry reached a higher development under the Sung dynasty.

The age of the Sung dynasty is the most philosophical and at the same time the most literary period in the history of China. Before this time Confucians could not comprehend the significance of the religion and philosophy of Buddhism. They simply ridiculed it and did not condescend to study its books. This is clearly shown in the fact that Han Yü, the most learned or rather most brilliant scholar

of the T'angs, did not know anything about Buddhism when he wrote the famous *Fo Ku Piao* and the *Yüan Tao*. There was not a single Chinese scholar under the T'angs that could be called a thinker. It is a very remarkable phenomenon in the history of a nation that the Chinese mind long remained entirely under a lethargic spell after it had exhibited a flashlight-like intellectual activity in the so-called ante-Ch'in period. But after this long period of sterility of not less than one thousand years China was once more awakened with the whole intellectual vitality. What a magnificent sight from the literary as well as from the philosophical point of view we have during the reign of the Sungs! And this display of fine imagination and high intellectuality was nothing more than the effect of Buddhist thought.

Let those Confucians or prejudiced critics who doubt this statement glance over a list of eminent figures that were the shining stars of the Sung literature. Among philosophers Chou Mao-Shu, Ch'êng Y, Ch'êng Hao, Chang Tsai, Chu Hsi, and Liu Chiu-yüen; among men of letters Ou Yang-hsiu, Su Shih, Su Chê, Wang An-shih; among poets Su Tzu-mei, Mei Shêng-yü, Huang Shan-ku, Liu Fang-wang—every one of them was under the overwhelming influence of the Buddhist view of life. Some of them indeed drew almost all their poetical and philosophical inspirations from Mahâyâna doctrines. Take away the significance of Buddhism from the background of the Sung literature, and we have meaningless efforts scattered here and there in a chaotic nebula.

The Sung dynasty was an age not only for belles-lettres, but also for Buddhist literature, the crop of which was especially rich at this time.

My criticism has become almost too specific for a small work, but the notoriety and scholarship of the author seem to demand a detailed exposition of its shortcomings. There is no doubt about Professor Giles's having done a good service to sinology by presenting his opportune work to English readers, but unfortunately his *History of Chinese Literature* does not justify its title nor can it be recommended as an "introduction" for those readers who do not know anything about the civilisation of the people of the Celestial Empire. Professor Giles may be one of the best Western sinologues now living, and is certainly the first European scholar who has ventured on what he terms a "general historical survey" of Chinese literature; but he is assuming too much when he declares that his work is "the first attempt made in *any* language." It is a great pity that he does not apparently understand Japanese, an almost indispensable, or at least very desirable, accompaniment to a complete comprehension of Chinese affairs. There are in every branch of literature several works written in Japanese which should not be overlooked; and certainly some of those Japanese works on Chinese literature are superior to Professor Giles's book and would be available not only for foreigners, but also for the use of native scholars. Could he have had access to them, he would undoubtedly have produced a more satisfactory work than the one before us, and would have better benefited Western readers.

T. Suzuki.

BOOK REVIEWS.

WHAT IS CHRISTIANITY? Sixteen Lectures Delivered in the University of Berlin During the Winter Term 1899–1900. By *Adolf Harnack*. Translated into English by Thomas Bailey Saunders. New York: G. P. Putnam's Sons. 1901. Pages, 301.

In the very brief preface to the English edition of these remarkable Lectures Professor Harnack declares that "the theologians of every country only half discharge their duties if they think it enough to treat of the Gospel in the recondite language of learning and bury it in scholarly folios." As all who are acquainted with the theological literature of our time are aware, he is himself equalled by few and surpassed by none in extent and variety of erudition, in accuracy, in wide view and comprehensive grasp. His *History of Dogma*, which in the very year of its completion not only became the standard work on the subject but also displaced all others, is a monument of patient scholarship which might well have formed the labor of a lifetime. Yet this is only one of his great achievements as a scholar. But Professor Harnack is more than a scholar and a critic. He is a man of deep religious enthusiasm. He is a personality rich in moral influence. He is also an orator able to rivet the attention whether of an academic or of a popular audience. When, therefore, he announced that he would deliver a series of lectures on the essential features of the Christian religion and the developments which it has exhibited in the course of history, and that the lectures would be open to students in any faculty, he attracted a class such as has probably never been seen in Berlin since the days when Fichte made his great speeches to the German nation. Not only did students of theology, history, and literature attend, but young lawyers, doctors, surgeons, and candidates for official appointments as well. That so large and so miscellaneous an audience should have assembled to hear a series of lectures on Christianity given outside the regular programme of study and bearing no relation to any examinations, is a fact which will be fully appreciated only by those who know what the conditions of life are amongst the undergraduates in a modern university.

The theme of these lectures is simple: "What is Christianity? What was it? What has it become?" Professor Harnack declines to treat Christianity from

the point of view of the apologist or the religious philosopher ; apologetics, he says, even if a discipline better developed than it is, has nothing to do with the purely historical question which he proposes to answer ; nor has speculative reasoning as to the content of the several conceptions of religion. His aim is to examine Christianity as it was in its origin and as it was transformed in the march of the centuries. He tells us that we must look not only at Jesus Christ and his Gospel but also at "the reflexion and the effects which he produced in those whose leader and master he became." "The more powerful the personality which a man possesses, and the more he takes hold of the inner life of others, the less can the sum total of what he is be known only by what he himself says and does." Nor is this all. We must go further ; we must trace the meaning and destiny of the Gospel as unfolded in time, in the conviction that it is not identical with the shape which it took at first but "contains something which, under differing historical forms, is of permanent validity."

To give in a brief space any adequate account of Professor Harnack's presentation of the Gospel as enunciated by Jesus Christ, both in regard to its leading features and in its relation to certain general problems of life and civilisation, and then of his masterly exposition of the destiny of the Gospel in the apostolic age, in Catholicism, Greek and Roman, and in Protestantism, is quite impossible. All that can be done here is to indicate the bare results at which he arrives. He is well aware of the general criticism that what Jesus Christ proclaimed had been proclaimed before, and he frankly admits, with Wellhausen, that the Gospel was also to be found in the prophets and even in the Jewish tradition of the time. "What, then, was there that was new?" he asks.

"The question is out of place in monotheistic religion. Ask rather : 'Had what was here proclaimed any strength and any vigor ?' I answer : Take the people of Israel and search the whole history of their religion ; take history generally, and where will you find any message about God and the good that was ever so pure and so full of strength—for purity and strength go together—as we hear and read of in the Gospels ? As regards purity, the spring of holiness had, indeed, long been opened ; but it was choked with sand and dirt, and its water was polluted. For rabbis and theologians to come afterwards and distil this water, even if they were successful, makes no difference. But now the spring burst forth afresh, and broke a new way for itself through the rubbish—through the rubbish which priests and theologians had heaped up so as to smother the true element in religion ; for how often does it happen in history that theology is only the instrument by which religion is discarded ! The other element was that of strength. Pharisaical teachers had proclaimed that everything was contained in the injunction to love God and one's neighbor. They spoke excellently ; the words might have come out of Jesus's mouth. But what was the result of their language ? That the nation, that in particular their own pupils, condemned the man who took the words seriously. All that they did was weak and, because weak, harmful. Words effect nothing ; it is

the power of the personality that stands behind them. But he 'thought as one having authority and not as the Scribes.' Such was the impression of him which his disciples received. His words became to them 'the words of life,' seeds which sprang up and bore fruit. That was what was new." (Pp. 47–49.)

He sums up Jesus Christ's teaching under the three heads: the kingdom of God and its coming, God the Father and the infinite value of the human soul, and the commandment of love; and he shows how that teaching is contained in its entirety in each of the three. Nor is it difficult to conclude that in Professor Harnack's view the Fatherhood of God is the fundamental thought at the centre of Christianity, and that the "kingdom" is ultimately, as he says, "the treasure which the soul possesses in the eternal and merciful God." He deals, too, in a very striking, frank and original way with the application of this teaching to such questions as asceticism, the burden of poverty and distress, public order and civilisation. The point of view which he inculcates is nowhere better stated than on pages 115 and 116:

"The Gospel makes its appeal to the inner man, who, whether he is well or wounded, in a happy position or a miserable, obliged to spend his earthly life fighting or quietly maintaining what he has won, always remains the same. 'My kingdom is not of this world'; it is no earthly kingdom that the Gospel establishes. These words not only exclude such a political theocracy as the Pope aims at setting up and all worldly dominion; they have a much wider range. Negatively they forbid all direct and formal interference of religion in worldly affairs. Positively what the Gospel says is this: Whoever you may be, and whatever your position, whether bondman or free, whether fighting or at rest—your real task in life is always the same. There is only *one* relation and *one* idea which you must not violate, and in the face of which all others are only transient wrappings and vain show: to be a child of God and a citizen of His kingdom, and to exercise love. How you are to maintain yourself in this life on earth, and in what way you are to serve your neighbor, is left to you and your own liberty of action. This is what the apostle Paul understood by the Gospel, and I do not believe that he misunderstood it. Then let us fight, let us struggle, let us get justice for the oppressed, let us order the circumstances of the world as we with a clear conscience can, and as we may think best for our neighbor; but do not let us expect the Gospel to afford us any direct help; let us make no selfish demands for ourselves; and let us not forget that the world passes away, not only with the lusts thereof, but also with its regulations and its goods! Once more be it said: the Gospel knows only one goal, one idea; and it demands of a man that he shall never put them aside. If the exhortation to renounce takes, in a harsh and onesided way, a foremost place in Jesus's words, we must be careful to keep before our eyes the paramount and exclusive claims of the relation to God and the idea of love. The Gospel is above all questions of mundane development; it is concerned not with material things but with the souls of men."

Professor Harnack's treatment of the questions involved in the titles "Son of God" and "Messiah" as applied to Jesus Christ and of the belief in his Resurrection is eminently characteristic of the historian anxious to extract from the creeds whatever of value they may contain. The consciousness which Jesus Christ possessed of being the Son of God is, he asserts, nothing but "the practical consequence of knowing God as the Father and as his Father," and it was, he continues, closely connected with the historic idea of a Messiah which he took up and transformed. But at the same time he indicates his own view with sufficient plainness by declaring, with emphasis, that "*the Gospel, as Jesus proclaimed it, has to do with the Father only and not with the Son.*" This, he says, is "the simple expression of the actual fact as the evangelists give it." In answer to the objection that the Gospel is an antiquated belief which can have no further significance for us, he dwells with much eloquence on its "timeless" character, its relation to the inner man.

"I do not know how our increased knowledge of nature is to hinder us from bearing witness to the truth of the creed that 'The world passeth away, and the lust thereof, but he that doeth the will of God abideth for ever.' We have to do with a dualism which arose we know not how; but as moral beings we are convinced that, as it has been given us in order that we may overcome it in ourselves and bring it to a unity, so also it goes back to an original unity, and will at last find its reconciliation in the great far-off event, the realised dominion of the Good."

We now pass to the development of Christianity in the apostolic age. Paul's work in transforming the simple faith in the Fatherhood of God into a universal religion and in laying the foundations of a great Church is skilfully described. In this view Paul emerges once again as "the missioner, the teacher, the schoolmaster, the organiser." Of this transformation Catholicism was the inevitable result, more particularly after the struggle with the gnostic movement made it necessary for the Church to close up its ranks and define its boundaries if it was to survive and do its work. But with the transformation came a change that was not without many disadvantages. The acute phase of Hellenisation with which the Church was threatened may, indeed, have been avoided, but the idea began to make itself felt that "religion is first and foremost doctrine, and doctrine, too, that is coextensive with the whole range of knowledge." Other formal elements made their appearance, and alien accretions began to disfigure and disguise the original enthusiasm. The form which Catholicism assumed in the Greek Church was, says Professor Harnack, "not a Christian product in a Greek dress, but a Greek product in a Christian dress"; that is to say, it was simply the continuation of the old Greek religion under the influence of the new ideas. Christianity became a cult. Traditionalism, intellectualism, and ritualism are the fundamental notes of a Church in which "doctrine comes to be administered in stereotyped formulas accompanied by symbolic acts"; the sort of religion, as we are reminded, "to abolish which Jesus Christ suffered himself to be nailed to the cross." When Christianity in the

West took shape as the Roman Church, a structure arose "the most comprehensive and the vastest, the most complicated and yet at the same time the most uniform, that history has produced." Of the three characteristics of the Church—the Catholicism which it shares with its Greek sister, the spirit of the Roman Empire, and the religious fervor of St. Augustine, the second is incomparably the most striking to the outward eye. "The Roman Church," says Professor Harnack, "privily pushed itself into the position of the Roman World-Empire"; the Pope is Pontifex Maximus and the successor of the Cæsars. This, he continues, is the true state of the matter historically, and the most fruitful way of describing the character of the Roman Church. "It still governs the nations; its popes rule like Trajan and Marcus Aurelius; Peter and Paul have taken the place of Romulus and Remus; the bishops and archbishops, of the proconsuls; the troops of priests and monks correspond to the legions; the Jesuits to the imperial body-guard."

In the two concluding lectures Protestantism is treated not only as a reformation but also as a revolution. In both aspects what was involved, we are told, was "*a critical reduction to principles*," a return to Christianity as the word of God and the power of faith; and this return meant a protest against the whole system of legal ordinance with which the Roman Church had overlaid and obscured the Gospel. But Professor Harnack is not blind to the faults of Protestantism. "We get nothing," he says, "from history without paying for it, and for a violent movement we have to pay double." Protestantism destroyed the unity of Western civilisation. The system of State-Churches which it encouraged has many disadvantages. In laying exclusive emphasis upon faith alone, it produced some want of serious purpose in the conduct of life. Nor was Protestantism able to perceive all the conclusions to which it naturally led, much less to give them effect. The consequence was that Luther bound himself to much that cannot be otherwise described than as a variety of that intellectualism which characterised the Schoolmen. These defects have come home to the Evangelical Churches, and in our own day Protestantism is threatened by three most powerful forces—the indifference of the masses, the tendency to regard religion as a mere adjunct to life, an æsthetic consolation, and the pressure of the State view that the Churches are institutions of public utility. Against these forces what is wanted is "to maintain Christian earnestness and liberty as presented in the Gospel."

No part of this exposition of Christianity in its origin and its history is so expressive and significant as the words with which Professor Harnack brings his lectures to a conclusion. They contain a personal touch which shows us in what light the lecturer himself regards some of the obvious difficulties and perplexities of his task. Critics have complained that he leaves them much in doubt as to the views which he entertains on certain mysterious doctrines of the Christian religion. Let his own words answer them:

"Gentlemen, it is religion, the love of God and neighbor, which gives life a meaning; knowledge cannot do it. Let me, if you please, speak of my own expe-

rience, as one who for thirty years has taken an earnest interest in these things. Pure knowledge is a glorious thing, and woe to the man who holds it light or blunts his sense for it. But to the question, Whence, whither, and to what purpose, it gives an answer to-day as little as it did two or three thousand years ago. It does, indeed, instruct us in facts; it detects inconsistencies; it links phenomena; it corrects the deceptions of sense and idea. But where and how the curve of the world and the curve of our own life begin—that curve of which it shows us only a section—and whither this curve leads, knowledge does not tell us. But if with a steady will we affirm the forces and the standards which on the summits of our inner life shine out as our highest good, nay, as our real self; if we are earnest and courageous enough to accept them as the great Reality and direct our lives by them; and if we then look at the course of mankind's history, follow its upward development, and search, in strenuous and patient service, for the communion of minds in it, we shall not faint in weariness and despair, but become certain of God, of the God whom Jesus Christ called his Father, and who is also our Father."

Much praise is due to the translator of this work for the admirable manner in which he has performed his difficult task. But Mr. Saunders has only confirmed here the high reputation which he gained by his idiomatic translations of Schopenhauer's essays. T.

A History of Babylonia and Assyria. By *Robert William Rogers*, Ph. D. (Leipzig), D. D., LL. D., F. R. G. S., Professor in Drew Theological Seminary, Madison, New Jersey. New York: Eaton and Mains. Cincinnati: Jennings & Pye. 1901. 2 Volumes. Vol. I., pages 429; Vol. II., pages 418. Price, $5.00.

The story of the discovery of the history and literature of Assyria and Babylonia as narrated in these two volumes by Dr. Rogers is as fascinating as any novel. Prior to 1820, the only knowledge the world possessed of Babylon and Nineveh was derived entirely from extraneous sources, Greek, Latin, Biblical, etc.; Babylon and Nineveh themselves had always preserved the silence of the grave.

Since that year, however, great libraries have been unearthed from the ancient sites of these cities, telling of their history, their science, their architecture, their jurisprudence, their religion, and their ethics, all written in an absolutely unknown language, which it remained for scholars to decipher. It is interesting to observe that the restoration of the life of Babylonia and Assyria and the decipherment of the cuneiform script of the Babylonians and Assyrians did not begin in connexion with Babylonia and Nineveh themselves, but took their origin in a far distant spot in Persia, in the ruins of Persepolis, the ancient capital of the Persian kings. These ruins the very earliest travellers had admired, and incidentally had discovered certain curious inscriptions written in wedge-shaped, arrow-headed characters. The first step in the decipherment of these inscriptions was taken in 1621 in a guess

made by a traveller, Pietro Della Valle, that the characters were to be read from the left to the right. This was afterwards confirmed by examination of more accurate copies of the inscriptions made by Sir John Chardin, in 1643. Kaempfer, a German Japanese and Oriental scholar, later took up the problem as to whether the characters were ideographic, syllabic, or alphabetic, but naturally could not arrive at a convincing conclusion with the data at his command. The traveller Niebuhr, father of the great historian, (1767) made more accurate and extensive copies of the inscriptions, and was lead to the conclusion that there were three separate systems of writing embodied. It did not occur to him that three languages were here represented, but he divided the inscriptions into three distinct classes and by careful comparison was able to show that only forty-two distinct signs were used. His list of signs was so nearly complete and so accurate that later study has made but little change in it. Niebuhr could now safely draw the conclusion that this language, whatever it might be, was written in alphabetic characters. This was a decisive step in advance; but Niebuhr did not possess sufficient linguistic or historical training to go farther. Tychsen of Rostock (in 1798) noticed a diagonal wedge in the inscriptions and suggested that it was the dividing sign used to separate words; he also declared that all the inscriptions of Niebuhr with one exception were written *in three different languages*. A very important historical conjecture was then made by Münter, of Copenhagen, to the effect that the builders of Persepolis were of the dynasty of the Achæmenides who reigned *circa* 730-330 B. C.; this conjecture afterwards enabled Grotefend to hit upon the names of certain kings. Münter also recognised the vowel *a* and the consonant *b*. "This was the first sure step in the decipherment. From our present point of view it may sound small, but it is to be remembered that it was made without the assistance of any bilingual text, taken bodily out of the darkness and gloom which had settled over this language centuries before. It was an achievement far exceeding that of the Egyptian hieroglyphics, which was secured by the aid of a bilingual text containing Greek. The name of Münter may well be held in honor among all who covet knowledge of the past of the Orient."

Three great French Orientalists, Duperon, Burnouf, and De Sacy, now came forward, and the problem was attacked linguistically from the point of view of comparative philology. Duperon, after great hardships, mastered the Avestan language, and published (1771) the sacred books of Zoroaster. His decipherment of the Avestan supplied the grammatical structure and part of the vocabulary of a language spoken over the same territory as the ancient Persian, and it was likely that many of the old words had been taken up from the ancient tongue, that its structure, declensions, etc., resembled in some respects the old Persian. De Sacy, the greatest Arabic scholar of his age (1787–1791), deciphered the inscriptions written during the Sassanian period in the Palevi character (227–641 A. D.). Here too, it was likely that the style of the Sassanian inscriptions had been copied from the style in which the more ancient Achæmenian scribes had written. De Sacy

found that one stereotyped form in particular was used in which there was scarcely any departure. It was as follows:

"*N., the great king, the king of kings, the king of Iran and Aniran, son of N., the great king, etc.*"

It was with these data that Grotefend of Göttingen, a classical scholar and not an Orientalist, but a prince of decipherers, began his labors. Taking Niebuhr's inscriptions, he assumed that since they accompanied the figures of kings they were titles of these monarchs and were presumably similar to the inscriptions of the Sassanian kings which De Sacy had just deciphered. It had previously been found by Münter that frequently a certain word appeared in these inscriptions in a short form and then again in a longer form, and the conjecture was immediate that in the latter case some grammatical termination had been added. Grotefend, taking the Sassanian formula as his analogue, was persuaded that this word meant *king* in the shorter form and that when it appeared twice in other places, in both the shorter and the longer form, the expression meant *king of kings*. Further, in both inscriptions in the first line this same word occurred a second time, followed in both cases by another word, likewise in both cases the same. Referring to the Sassanian inscriptions, Grotefend concluded that the word meant *great* and the entire inscription *great king*. But all this was conjecture. The words had not yet been alphabetically analysed, and it was to this analysis that Grotefend now bent his energies.

In the Sassanian inscriptions the first word was always the king's name; this was also probably the case in these Persian cuneiform inscriptions. If it were, then the inscriptions were set up by different kings, for the first words in the two cases were different. But the name with which the first began appeared in the second with its ending changed. From its situation in the two places, Grotefend concluded that the first was the name in the nominative and that the second was the name in the genitive, and thus the first inscription would begin: "*N., great king, king of kings*"; and in the second the word in its variant form would be equivalent to "*Of N.*" In the second inscription, this name was further followed by the word for *king*, and after this came another word which, after the analogue of the Sassanian inscriptions, would naturally mean *son*. And hence the whole phrase in the second inscription would run in the transposed order of this ancient language: "*Of N. king son*," meaning "*Son of N. king.*" But the same word *son* also occurs in the first inscription, following a name not possessing the title of king. From all this, Grotefend surmised that he had in these two inscriptions the names of three rulers: (1) the grandfather who had founded the dynasty, but was himself not a king; (2) the son who succeeded him and bore the title of king; and (3) the grandson who had also the same title.

Now, it was known by the discovery of Münter that the age of this inscription was the age of the dynasty of the Achæmenides, and it now only remained to search in the annals of this dynasty for three names that fitted the case. The first names

thought of were Cambyses, Cyrus, and Cambyses, but since the names of grandfather and grandson were here exactly alike, while on the inscriptions they were different, the conjecture failed. The next three considered were Hystaspes, Darius, and Xerxes. If this last assumption were correct, then the seven signs with which the first inscription began must be the name Darius, and the next thing to do was to find the form of the name Darius in ancient Persian. This was a difficult task, as the Greeks, in transliterating Oriental names, were exceedingly careless; but from a clue in Strabo and from the Hebrew form of the word he ventured upon the form Darheush, in which, as later inquiry showed, there were only two errors, namely that of *h* and *e*. Since nearly all the same letters were used in the second word, the transliteration of the latter was comparatively easy. The third name was also conjectured, with only two errors. The result was that Grotefend felt confident of having discovered thirteen of the forty-two alphabetic characters of which the Persian alphabet was supposed to be composed. It was an epoch-making result, and met with the usual fate of such achievements: The Göttingen Academy of Sciences refused to take the risk of disgracing itself by publishing Grotefend's paper, which saw the light of day soon afterwards as an appendix to the work of the great Göttingen historian, Heeren.

Grotefend had accomplished wonders; but not being an Oriental scholar he was now "at the end of his Latin," or rather, of his Persian. He did not have the Oriental spirit; he did not have an historical feeling for the Oriental environment. But it was he who first learned how to read an ancient Persian word, and from this in due course came the power to read the words of Babylonian and Assyrian. "To very few men," says Dr. Rogers, "has it happened to make discoveries of such moment."

Burnouf, the great French Orientalist, at once espoused Grotefend's cause, and brought his enormous Oriental learning to bear upon the problem. Burnouf had given the grammar of the Avestan a scientific basis, to which he added a knowledge of Persian life and religion which no one then possessed. He took one of Niebuhr's inscriptions that gave a list of the names of countries, and knowing these countries from other sources he found the equivalent for almost every character in the Persian alphabet. He next determined that the old Persian was not the same language as Avestan, but was closely related to it, and hence that all the Indo-European languages would contribute great light to the study of old Persian.

Lassen and Westergaard followed with more discoveries. An English officer, Major (afterward Sir) Henry Rawlinson, crowned the labors of all. His opportunities enabled him to copy and study many inscriptions inaccessible in Europe, and although his work was carried on under great difficulties, of which European scholars had never dreamed, he was successful in making an intelligible and connected translation of the long inscription of Darius on the rocks at Behistun, which he had copied at the risk of his life, beneath the blazing sun. Although he was early in communication with Burnouf and Lassen, his first work seems to have

been entirely independent of European influence, and is remarkable as having been strikingly similar to that of Grotefend. A third investigator, the Rev. Edward Hincks, a quiet country rector at Killyleagh, County Down, Ireland, one of the pioneers of Egyptian decipherment, also arrived independently at the translations of some of the Persepolitan texts. Says Dr. Rogers: "The work of decipherment was now over as far as the ancient Persian inscriptions were concerned. There was, of course, much more to be learned concerning the language and concerning the historical material which the inscriptions had provided. On these and other points investigation would go on even to this hour. But the pure work of the decipherer was ended, the texts were read. A language long dead lived again. Men long silent had spoken again. It seemed a dream; it was a genuine reality, the result of long and painful study through a series of years by scores of men, each contributing his share."

Such in brief is the romantic account as told in full by Dr. Rogers of the decipherment of the Persian cuneiform inscriptions of Persepolis; and now as to the bearing of this story on Assyrian, wherein we can be brief.

The mounds of Nineveh and Babylonia prior to the seventeenth century were known only to the traveller. The history of these cities was accessible only to the Greeks and the Latins and from some allusions in the Old Testament. In the eighteenth and the early part of the nineteenth centuries, the real explorations began. Niebuhr, Beauchamp, and Olivier determined the sites of these ancient cities; cylinders were discovered covered with a writing resembling the inscriptions of Persepolis; and James Rich and Sir Robert Kerr Porter, two Englishmen, by their enthusiastic descriptions aroused European interest to the highest pitch. Then followed the wonderful period of excavations, from 1843 to 1854, which were at first almost exclusively conducted by the French under Botta, and afterwards by the English under Layard and Rawlinson.

The results of these excavations ending in the astounding discovery of Rassam of the library of the royal city of Nineveh, gathered by Assurbanipal, were finally laid before the historians and linguists of the Orient for decipherment. The story is too long to give in full here. The task was accomplished in immediate connexion with the reading of the ancient Persian cuneiform inscriptions at Persepolis.

It will be remembered that only the first of the three languages found in the inscriptions at Persepolis had been deciphered; this was the ancient Persian. The second language was thought to be that of the Scythians or that of the Medes. It was here that Grotefend failed. Westergaard, Hincks, De Saulcy, Sir Henry Rawlinson, Sayce, Norris, Oppert, Loewenstein, and Talbot, were the great names in the decipherment of Assyrian and Babylonian inscriptions down to the year 1870, and by their labors the art may be said to have reached an assured position. The study of Assyrian began to take its place by the side of its older sisters in the universities; the material which Botta had sent to Paris, the inscriptions which Layard, Loftus, Taylor, and Rassam were sending to London, were quickly read, and

the history, religion, and literature of the ancient monarchies were more and more clearly elucidated. The decipherment of the Sumerian and Vannic languages followed with the excavations and explorations of the period between 1872 and 1900.

The new material, much of which has been gathered by the University of Pennsylvania, has not yet been fully exploited, but a vast amount of it has been interpreted, sufficient to give an elaborate picture of Assyrian and Babylonian history, civilisation, culture, religion, and modes of life. This Dr. Rogers has attempted to do in two large volumes, the interest of which may be gathered from the foregoing synopsis of a part only, and from the fact that the work, although written last year, is now in its second edition. *μ.*

LEHRBUCH DER PHYSIOLOGIE DES MENSCHEN. Von *G. von Bunge*, Professor in Basel. Erster Band: Sinne, Nerven, Muskeln, Fortpflanzung, in Achtundzwanzig Vorträgen. Mit 67 Abbildungen im Text und 2 Tafeln. Leipzig: Verlag von F. C. W. Vogel. 1901. Pages, viii, 381. Price, 10 Marks.

A work on human physiology by the distinguished professor of that branch in the University of Basel, Switzerland, will be welcomed on many sides. Not only has Professor Bunge displayed in his professional activity a wide acquaintance with physical and chemical science, but he has also come prominently before the scientific public as the representative of a new species of vitalism in biology. The old doctrine of vital or hyper-mechanical force which dominated the eighteenth century and still lingered in the thought of Johannes Müller, the greatest physiologist of history, has found its reviviscence in the last few decades in the persons of many eminent modern inquirers; and it has, in the variations which the modern scientific point of view has imposed upon it, been joyously received, and put to the most varied religious and teleological uses, by mystics, reactionaries, and devotees of esotericism in general, as well as by earnest religious thinkers. Most pronounced in the resumption of the old vitalistic view have been the botanists Hanstein and Kerner von Marilaun, and the pathologist Rindfleisch. The neo-vitalism of Bunge, however, is more philosophically established and more scientifically grounded than the majority of these vagaries, and it has, in its fundamental principles at least, much support from philosophical quarters. It must be noted, nevertheless, that the tendency of science at the present moment is in the opposite direction, and that the recent important discovery of mechanical and physico-chemical analogies to vital phenomena have rather weakened than strengthened Bunge's position in its full extent. As for Bunge himself, he openly accepts the tenets of the ancient vitalistic creed when he says in his *Physiological and Pathological Chemistry* (1889): "I must emphatically differ with you if you think you can refute vitalism by saying that there are no other factors active in living beings than the forces and materials of inanimate nature alone." On the other hand, it appears that Bunge's vitalism is nothing more than the expression of his philosophy of subjective idealism, which holds that it is a reversal of the true order of things to explain psychi-

cal processes by the mechanics of atoms. Bunge says, in the work before quoted: "The science of vitalism is simply the adoption of the only genuine and correct method of scientific inquiry, which is that of starting from the known or inner world, and attempting to explain the unknown or outer world." In other words, his vitalism is simply a statement of the fact that it is impossible to resolve psychical processes by the physics and chemistry of matter. And in doing so, Bunge sets up the old dualistic dogma of a contrariety between the living and the lifeless, between unsouled and ensouled nature. This has led him to the assumption of the principle of the eternity of life in the universe, analogous to the physical law of the eternity of matter and energy. Since the speculations which have led him to this conclusion are interesting, however weak and unconvincing they may seem to positive and more critically trained minds, we shall give a brief synopsis of them, and of the scientific grounds on which they rest.

The question of whether a living cell can be built up from dead matter, whether spontaneous generation or abiogenesis is possible, cannot be decided in the present state of our knowledge. Its possibility must at least be admitted even though the experiments to establish it have turned out negatively, for we can never fulfil all the conceivable conditions of such a process. Yet, while all experiments have hitherto proved futile, the majority of biologists have concluded, from the fact that our earth was once a fiery mass like the sun of to-day from which it separated, that life could not possibly have existed upon it in the beginning, and that there must have been a period of time at which the first cell was formed from inanimate matter.

Now, Bunge believes,—and the grounds of his belief will have different weight with different minds,—that this doctrine was greatly invalidated by the considerations advanced by the German physician Richter (1808–1876), a professor of medicine in Dresden. Richter's theory is well known to scientists, and is not in the best repute in all quarters. Richter maintains that it was possible after the earth had cooled, for the first living cell to have reached it from some other heavenly body. His arguments are that the universe is infinite in time and space; it never began and will never cease. Matter and energy are indestructible. The sole thing that incessantly changes is form. Space is filled with originating, with matured, and with dying celestial bodies, where by "matured" is understood such as are capable of sustaining organic life. Consequently the existence of organic life in the universe must be held to be universal. It has existed from all eternity, has propagated itself in organised form, not as a mysterious primordial viscous slime, but as living organisms, as cells, or as individuals composed of cells. *Omne vivum ab æternitate e cellula!*

This disposes of the question of the origin of the first organisms, but granting that such have always existed in the world, how could they possibly have found lodgment upon this or that particular heavenly body, which, from having been uninhabitable, has become habitable. Richter answers: "Directly out of space."

Countless masses of minute substances are hovering in space, from the tenuous tails of comets to the meteoric stones which incandesce in our atmosphere, and sometimes fall to the earth. Remnants of organic substances (carbon) have been found in these. The question whether these organic substances before being destroyed by the incandescence of the meteor were composed of formless primordial slime or of formed organised structures, is to be answered in favor of the latter; for we have an analogue of the occurrence in our own atmosphere. If air be filtered through cotton, microscopic organic bodies will invariably be found in it. The equatorial winds carry great quantities of infusorial dust from Africa and South America, high over the Alps and the Pyrenees, to central Europe. The snow of the Alps may sometimes be seen covered with red infusoria. But if microscopic organisms hover so high in the atmosphere of the earth, and consequently equally high in the atmosphere of any other inhabited heavenly body, it would be quite easy for them to be attracted into space by passing comets or aerolites, and to be subsequently deposited upon another habitable world, and there spontaneously developed into higher forms. So far, Richter.

Two eminent physicists, Helmholtz and Lord Kelvin, have also tentatively admitted the possibility of the cosmic origin of life. The main objection to this theory is the low temperature of cosmic space, namely —273 C., which is such that whether the germs clung to meteoric stones or hovered free in the ether, they would be totally destroyed by the cold. Bunge remarks in this connexion that it is to be remembered that the very simplest organisms, especially spores, can endure very low temperatures. Pictet and Yung subjected bacteria to a temperature of —130 C., and found that some species remained alive even at this low temperature. "Why," Bunge asks, "should not spores exist capable of surviving the journey through the frigid regions of space?" Another objection is that, granting that organic germs might accidentally escape the destruction of their ancestral planets, they could not possibly escape destruction from the heat generated by the passage through the terrestrial atmosphere of the meteorites to which they cling.

It would seem to be asking a great deal of organic germs that they should be able to survive temperatures ranging from absolute zero to that required to volatilise all known metals; but neither Helmholtz nor Professor Bunge is disconcerted by this astonishing display of powers of endurance. Helmholtz contends that the larger meteoric stones are heated only in their outer layers in their passage through the earth's atmosphere, and that germs might lie hidden in the interstices of the interiors; or they might be blown off by the rush of the air before the meteor is ignited; while as for their escape from destruction from the possible annihilation of two colliding planets, Lord Kelvin has shown that the first consequences of such a collision would be mechanical movements only, and that heat could not be produced until these mechanical movements were destroyed by friction,—which might take hours or days, and would consequently not interfere with the escape into space of planetary fragments broken off at the outset. And, as for the de-

struction of the germs by the heat generated in the earth's atmosphere, Professor Bunge points to the new experiments which show that certain spores are capable of enduring a temperature of from 110 to 140 degrees Centigrade.

To sum up, in view of the fact that the mystery of primitive generation still remains unsolved, Professor Bunge is fain to conclude that there is no reason whatever for assuming that organised life ever originated on our planet, that the possibility must be admitted that living cells never sprang from inanimate matter, but have been endowed with life eternally. The notion of life's being limited either in space or time is, he thinks, but the monstrous product of human limitations.

Such is a specimen of the character of Professor Bunge's book. It embraces the widest interests, philosophical as well as scientific, and when not concerned with Professor Bunge's special vitalistic point of view, is of course less speculative. The lectures are historical as well as expository, one of the most interesting of them being devoted to placing the achievements of Gall in the right light; persons in whose minds Gall is always associated with phrenologic extravagances should read this chapter. The lectures on heredity, propagation, animal electricity, hypnotism, sleep, etc., are also interesting from a broad point of view. The other lectures treat in a very simple and intelligible manner of the usual subjects of physiological text-books, such as the specific energies, the senses, the physiology of the brain, etc., etc. That Professor Bunge does not omit in some cases to strike even a religious note, may be gathered from the following quotation which ends his reflexions on the nature of propagation, individual and racial, and on the continuity of life:

"Weismann enunciated the doctrine that unicellular organisms have life im-
"mortal, for the reason that it can never be said after division which cell is the
"daughter cell and which the mother; each is as old as organic life itself. And
"the same is true of the highest organisms; each cell of a body has lived forever,
"and no cell, whether spermatozoic or ovarian, which has separated from the
"other cells, is older than any that has remained behind. Each cell has the right
"to say: 'I am the cell primordial.'—We live forever. And this is true even of
"those who have no direct descendants; they are one, by collateral lines, with all
"the coming generations. Indeed, the direct descendants of the great majority of
"men die out after a few generations.

"The future generations are we ourselves. We continue to live in those that
"come after us. Never has any religion, as the physiologist Victor Hensen has
"remarked, given adequate expression to this idea. It will constitute the founda-
"tion of every religion and ethics of the future. All the good that we have done
"in life redounds to our own advantage. And so even selfishness is forced into
"the service of unselfishness; all motives work in concert for the perfection and
"ennoblement of life. Even death has been robbed of its sting: the death of an
"individual annihilates nothing of life. Individuals perish, millions and millions

"each second. But life ceases never a moment. What does nature care for the "individual? What is the significance of the continuity of individual conscious- "ness? We forget the old pains. We awaken in new forms to new hopes and "new battles. Spring of eternal youth, immortality of life perennial, joyance "never-ending and ever-renewed!" μ.

GUSTAV THEODOR FECHNER. Rede zur Feier seines hundertjährigen Geburtstages gehalten. Von *Wilhelm Wundt*. Mit Beilagen und einer Abbildung des Fechner-Denkmals. Leipzig: Verlag von Wilhelm Engelmann. 1901. Pages, 92. Price, 2 marks.

It is unnecessary for us to recall in full the details of the life and career of Gustav Theodor Fechner. Let it suffice to give Wundt's views of the philosophical standing of this great inquirer and thinker, founder of modern experimental psychology, and reviver of the *Naturphilosophie* of Schelling, and to point out the dominant notes of his career.

Fechner was primarily a natural inquirer, his departments having been physics, chemistry, and general medicine. He was the translator, compiler, and editor of many text-books in these different branches, and subsequently an author of philosophical, ethical, and mystical writings. He was first concerned altogether with the solution of concrete problems, and it was through the methodology involved in his exact scientific labors that his attention was directed to philosophy. This philosophy was half humorously and half seriously expounded in treatises bearing the titles of (1) *The Comparative Anatomy of Angels* (1825), the *Booklet of Life and Death* (1835), *Nana, or the Psychic Life of Plants* (1848), the *Zend-Avesta* (1851), etc., etc.; it being important to note in this connexion that Fechner's epoch-making works on *Psychophysics* appeared subsequently to his mystical philosophical writings.

The view that not only men and animals, but also plants, the earth itself, the planets and the fixed stars, are ensouled beings, is shared by Fechner's system in common with many other imaginative philosophical constructions, but in his case it may be shown to be an independent, intellectual creation, and its scientific justification stands on an entirely different footing from that of the ancient, mythological systems. Fechner was acquainted with Schelling, he had read parts of Oken, but whatever impulse he may have received from their speculations, his own had always been carried on in connexion with the newer and more critical development of science. The scientific discoveries of the time of Schelling and Oken were tremendous, but the philosophical interpretation of these results had made so little advancement, and the critical attitude of the mind generally had been so slightly developed, that Schelling and Oken might well be pardoned for their indulgence in fantastic speculations and for their having produced so little of lasting value. Fechner, on the other hand, had the advantage of a more exact science, of a more critical scientific philosophy, and consequently his conception of the world, poet-

ical and fantastic as it may have been, was nevertheless in closer contact with genuine inquiry; and it is consequently not surprising that by his efforts to support and substantiate his philosophical system he produced results of real scientific worth.

Fechner's philosophical, we might almost say theosophical, doctrine of panbiotism and pan-psychism, of the graduated structural constitution and development of all animate creatures, took its origin and growth independently of his scientific works. His exact scientific research was subordinated to his philosophical points of view. From the *Zend-Avesta* sprang his *Atomic Theory;* also his *Ideas on the History of Creation and Evolution*, and foremost of all his great work on *Psychophysics*. In his *Psychophysics* was expounded the law of the limits, range, and gradations of sensation, etc., corresponding with which he conceived analogous, parallel systems, ranges, and limits of sensation in the remainder of the world. His psychophysics, it will be seen, was thus a weapon for the defence of his philosophy. Its ultimate aim was the conversion of the scientific world to his peculiar philosophical and religious convictions. But of this work only the scientific results (his law of the threshold of sensation, his experimental methods for determining the relations between stimulus and sensation, his extension of Weber's law, etc.) attracted notice, received criticism or confirmation; his philosophical views of the relation subsisting between the individual consciousness and the collective consciousness lying below the threshold of the individual consciousness, and the consequent psychophysical structural gradation of the entire universe,—these views for which all the science of the book had served as a foundation, were received with condemnatory silence. Few psychologists have even read the parts in which these conclusions were set forth.

Fechner himself was sorely disappointed at what he regarded as the lack of success of his metaphysical efforts, and he was even inclined to think that the tenability of his experimental results was indissolubly bound up with the tenability of his antecedent mystical, philosophical conclusions. It was so with Kepler, who in the discovery of his famous third law of planetary motions was guided solely by his fantastic speculations concerning harmonic intervals and the Platonic solids and saw in it only the key-stone of his grand arch of mystical cosmic harmony. But Kepler's cosmic harmony has long since vanished and left not a rack behind; while his third law has become the foundation of a theory of which the beauty and the poetry have taken a much purer and a much exacter and more classical form. And so it is with the mystical parts of Fechner's *Psychophysics;* what shall remain unforgotten is the fact that he was the first to introduce exact methods and exact principles of measurement and experimental observation into psychological inquiry, and that he thus first rendered scientific psychology possible in the most rigorous sense of the word. The results that he accomplished were entirely the outcome of metaphysical notions, and since he looked upon them solely as devices for the enforcement of his metaphysics, he naturally underestimated their scope and impor-

tance. But to-day we know that far from being tainted by their metaphysical connexions, they have actually contributed most toward stripping psychology of its metaphysical character.

And now as to the position of Fechner's metaphysical system in the history of philosophy. Philosophy, according to Professor Wundt, is not an absolutely definite conception. There are two distinct species of thought traceable throughout all the history of philosophy. The first species seeks to epitomise the science of its time and to crystallise it into a systematic conception of the universe. Most perfect in this respect was the philosophy of Aristotle, in which the science of antiquity was focussed, and which dominated human thought for many, many centuries. Next in order, perfection, and influence were the systems of Descartes and Kant. The second species of philosophy, on the other hand, does not strive to be rigorously positive and scientific; but, dissatisfied with the results of purely rational thought, it seeks to construct its concepts of the universe by the aid of the imagination, and so aims to satisfy the longings of the heart, and to cast its searching eyes beyond the bounds which patient and plodding inquiry have marked out. This species of philosophy is wedded to poetry, and carries thought back to its ultimate source, in the mythological imagination. The greatest thinker of antiquity, Plato, took refuge in philosophical poetry and mythology wherever rigorous thought failed him; and it is the opinion of some that on this side of its development his system has been greatest and most effective. It is to this second species of philosophy that Fechner's system belongs,—to the domain of poetry and mythology combined. Philosophy for him was a matter of belief, not of knowledge. And if the philosophical offspring of poesy and fantasy be entitled to any rank and recognition in the republic of thought, as most will say they are, then Fechner's philosophy too may justly lay claim to lasting position and consideration. Such is Professor Wundt's view.

The present brochure, which is an address delivered in commemoration of the hundredth anniversary of Fechner's birth, contains as a frontispiece a photogravure of the monument erected to Fechner's memory in the Rosenthal at Leipzig; and in addition to Professor Wundt's excellent sketch of Fechner's philosophical significance contains matter in the way of personal recollections and expositions of Fechner's psychology and esthetics and of Fechner's relations to spiritualism, that are new and consequently will be of interest to the public. *u.*

THE LIMITS OF EVOLUTION AND OTHER ESSAYS. Illustrating the Metaphysical Theory of Personal Idealism. By *G. H. Howison, LL. D.*, Mills Professor of Philosophy in the University of California. New York: The Macmillan Company. London: Macmillan & Co., Ltd. 1901. Pages, xxxv, 396.

It is pleasant to compare the work of Professor Howison with the ordinary run of professional philosophical treatises. Where they (and most notably the Continental books) scarcely ever deign to give the inquiring reader the least clue to their

contents and purpose, he has given us in an admirable preface a precise summary of his doctrine, and has added so excellent an index and analytical table of contents that no one can be pardoned for miscomprehending his philosophy. The book is a collection of essays on topics bearing such titles as "The Limits of Evolution," "Modern Science and Pantheism," "Later German Philosophy," "The Art Principle as Represented in Poetry," "The Right Relation of Reason to Religion," "Human Immortality," "The Harmony of Determinism and Freedom,"—all apparently of a divergent character, but having withal a common and definite trend of thought applied to all the main concerns of human life, viz., to science, art, and religion.

Professor Howison has given his metaphysical theory the title of Personal Idealism. As to the objection to the epithet *personal*, he replies "that the actual history of philosophic thought, even after philosophy attains to the view that rational consciousness is the First Principle, exhibits a singular arrest of the movement toward putting complete personality at the centre of things. Historic idealism is, in fact, far from being personal; rather, it is well-nigh overwhelmingly impersonal." In its search after unity, the ideal of the monistic system, philosophy, whether materialistic or idealistic, he contends has always lost sight of its other interests, of which some are at least as great. The prevailing tendency has always been toward some form of monism, the absorption of all things, including individual minds, either in a single material Substance or in a single conscious Subject. Leibnitz alone, in the long history of idealistic thinking, has broken with the monistic tradition. The main drift of philosophic thought in the Western world for the past century has, surprising as it may seem, been increasingly toward the Oriental view of things, and has been at direct variance with the Occidental's instinctive preference for personal initiative responsibility and credit; and Professor Howison accordingly declares himself glad of an opportunity "to protest with him against this all-engulfing monism, fatal to our moral freedom even when taking on the plausible form of monistic idealism." Even idealistic monism, which he regards as a real philosophic advance on other forms of monism, is irreconcilable with personality; it annuls moral agencies and personal freedom in all conscious beings other than its so-called god, and so leaves its professed god without so much as a vestige of genuine personality. Now, it is the aim of the present collection of essays, says Professor Howison, to present "an idealistic system that shall be thoroughly personal in the sense just implied. Instead of any monism, these essays put forward a Pluralism: they advocate an eternal or metaphysical world of *many* minds, all alike possessing personal initiative, real self-direction, instead of an all-predestinating single Mind that alone has real free-agency."

In Professor Howison's philosophy, the ideal is central and determinative, the measure of all other reality. A composite of suggestions derived from Berkeley, Leibnitz, and Kant, this philosophy has pushed the idealistic, as well as the individualistic, principles to their furthest limits. We shall give in a few dogmatic

statements, in Professor Howison's own words, a summary of his position with regard to the great metaphysical problems.

All existence, he says, is either (1) *the existence of minds*, or (2) the *existence of the items and order of their experience*. Time and space, thus, owe their existence to the essential correlation and coexistence of minds. The mutual recognition of all minds as alike self-determining renders their coexistence *a moral order*. "These many minds, being in this mutual recognition of their moral reality the determining ground of all events and all mere 'things,' form the eternal (i. e., unconditionally real) world; and by a fitting metaphor, consecrated in the usage of ages, they may be said to constitute the 'City of God.' . . . The members of this Eternal Republic have no origin but their purely logical one of reference to each other, including thus their primary reference to God. . . . They have no origin at all—no source in *time* whatever. . . . They simply *are*, and together constitute the eternal order. They exist only in and through their mutually thought correlation, their eternal 'City,' and out of it would be non-existent. But through their thought-reciprocity with each other, God being included in the circle, they are the ground of all literally originated, all temporal and spatial existences. Hence, relatively to the natural world, they are free, in the sense of being in control of it: so far from being found *by* it and its laws, they are the very source of all the law there is or can be in it. Relatively to God also, and to each other, all minds other than God are free, in the still higher sense that nothing but their own light and conviction determines their actions toward each other or toward God. . . . This Pluralism held in union by reason, this World of Spirits, is thus the genuine *Unmoved One that moves all Things*. . . . Its oneness is not that of a single inflexible Unit, leaving no room for freedom in the many, for a many that is really many, but is the oneness of uniting harmony, of spontaneous coöperation, in which every member, from inner initiative, from native contemplation of the same Ideal, joins in moving all things changeable toward the common goal. This movement of things changeable toward the goal of a common Ideal is what we have in these days learned to call the process of Evolution. The World of Spirits, as the ground of it, can therefore neither be the product of evolution nor in any way subject to evolution."

As to creation, it is not an event, an act causative and effective in time; it is simply "such an eternal dependence of other souls upon God that the non-existence of God would involve the non-existence of all souls, while his existence is the essential supplementing Reality that raises them to reality; without him, they would be but void names and bare possibilities."

After the preceding statements, one will not be surprised to learn that the key to the whole view is to be found in its system of causation, which substitutes final cause for efficient cause; final cause being not merely the guiding and regulative, but actually the grounding and constitutive, principle of all real existence. A more absolute idealism it would be impossible to conceive. It solves admirably, for instance, the problem of personal freedom, but its solutions are entirely metaphys-

ical, and the system generally is unsupported by positive research. In this sense, we can scarcely see that Professor Howison's metaphysical predications concerning the nature of the moral order, the city of God, the interrelations of God and the individual minds, the process of evolution, the nature of creation, etc., are less "assumptions" than Berkeley's flat and unqualified postulation of a Divine Mind supporting and containing individual spirits. True, there is much more ado about the process by which the assumptions are reached; the reader is "led" to the assumptions through what Professor Howison terms "a logical continuum," and by means of a "transcendental principle." But analysis will show that ultimately Berkeley's position is just as well grounded, is just as rich in implications as Professor Howison's, not to speak of its being far simpler.

Much is to be said of Professor Howison's treatment, however, for the insight which it gives into the methods and the state of modern metaphysical speculation, and for his brief historical exposition of the views of Hartmann, Lange, and Dühring, the latter of whom is not as well known to American readers as he should be. The work may indeed be studied with profit by all students of metaphysics. *μ.*

THE PROBLEM OF CONDUCT. A Study in the Phenomenology of Ethics. By *Alfred Edward Taylor*, Assistant Lecturer in Greek and Philosophy at the Owens College, Manchester; Late Fellow of Merton College, Oxford. London: Macmillan & Co., Ltd.; New York: The Macmillan Co. 1901. Pages, vi, 501. Price, $3.25.

Mr. Taylor has given us in this volume a searching and comprehensive examination of the ethical problem, and has shown in his *résumés* and discussions generally a thorough mastery of the world's literature as well as its philosophy. The book is substantially the same as that which obtained the Green Moral Philosophy Prize in the University of Oxford for the year 1899, although it is far from agreeing in every point with the doctrines of the eminent English thinker in whose memory the prize in question was founded. We shall endeavor to indicate Mr. Taylor's position with respect to the main question of philosophy, the question of method, which here chiefly concerns us, by a few quotations; we shall see that his work has many sound elements to recommend it.

"All knowledge," he says, "according to our view, is empirical in the sense of being concerned in the last resort with the description of matters of fact or experience. But not all the branches of study treat the experienced facts which it is their business to ascertain and describe in one and the same way. The attitude of each of the ordinary departmental sciences to the great body of experienced facts which make up the life of the world may be said to be characterised at once by more or less strict limitation of range of vision, and by the endeavor, within a limited range, to take account of all important or typical facts. Comparative narrowness of range and accompanying fulness of detail within that range, these are the distinctive marks of the sciences which are called sometimes natural, some-

times positive, sometimes empirical, in each case with a certain conscious opposition to more philosophical or metaphysical or speculative forms of study. . . . For practical purposes this one-sidedness does not matter, so long as a science is successful in establishing links of connexion and detecting uniformities within that special aspect of experience to which it avowedly confines its attention; it is only when, as philosophers, we try to form some general conception of the nature of experienced reality as a whole, that it becomes important to insist on this peculiarity of scientific procedure, and to beware of being led, by overlooking it, into taking as the fundamental character of all reality what may be true only of some one aspect or part within the whole. . . . Instead of taking a part of the facts of life and trying to get as much detailed insight into them as possible, we may conceivably sit down to study experience and experienced facts broadly as a whole, and to ask, without attending to special matters of detail, whether we can detect any general characteristics which belong, not to this or that class of facts, or to this or that aspect of experience, but to the facts of life or the contents of experience viewed as a whole. If any such most fundamental characteristics of the world of experience are to be discovered, we clearly have in them the materials for such a science as was called by Aristotle Theology or First Philosophy, and by his editors metaphysics,—a science, that is, which aims at enunciating results which shall be true of things not merely in so far as they have extension, or outline, or movement, or any other special quality by which some one subsidiary class of experienced facts is differentiated from others, but universally and without restriction of all experienced contents whatever."

Now, Mr. Taylor contends, as many have contended before him, and will contend after him, "unto the last syllable of recorded time," that such a science is not only conceivable but actually possible. For "with all their infinite diversity, the facts of life present at least one common characteristic. Whatever else they may be, the facts upon which all our sciences are founded are all what the German language can describe by the convenient word *Erlebnisse*, things through which we have lived, bits of the experience of individual centres of thought and feeling. And since the ultimate aim of all the sciences is, as we have seen, to give such an account of the facts of experience as shall be consistent with appearances and with itself, we may fairly say that all scientific progress consists in the more and more adequate rendering of experience, or in the freeing of our descriptions of experience from the 'symbolic' elements which, as we have seen, enter so largely into our scientific hypotheses.

"We are thus led," the author continues, "by reflexion on the nature of scientific progress to the conception of the scientific ideal as a perfect or completed or pure experience, an experience which embraces not some merely, but all the events and processes which are the contents of the experience of ourselves and all other centres of thought and feeling, and beholds them as a single coherent and harmonious system, without any of the gaps, confusions, and contradictions insep-

arable from imperfect and symbolic knowledge. Such an all-embracing and finally consistent experience would in every case see things as they really are. Theory for it would be one with direct experience, and thus for it the ideals at which we are consciously or unconsciously aiming in all our thinking would be translated into actual facts. Whether such a complete or pure experience, with the whole of reality for its object, actually exists is a question which need not and must not be raised at this stage of our argument, but even if we suppose it to be nothing more than a mere 'regulative ideal' which actual knowledge is always approaching but never reaches, it is easy to see its enormous value. For it clearly affords us a standard or criterion by which to measure the degree of truth contained in the various conceptions of the general character of the world of reality."

The science embodying this ideal, now, is metaphysics, and it is "the business of metaphysics to test the various theories and propositions which pass for true in our everyday thinking or in our sciences by comparison with the ideal standard of a 'pure' or perfect experience, and to decide how far all or any of them satisfy the two requirements of agreement with the formal conditions of experience in general and with the material conditions of the particular experiences which they claim to represent."

Such, then, is the scope and function of metaphysics. And having reached a theory on this point, the next question to be asked is, What are the relations of metaphysics to the special science under consideration, viz,, *ethics*?

Here Mr. Taylor is opposed to the metaphysicians. He would not start from a purely "formal" conception of good or of "duty, deducible from the mere general analysis of the notion of rational or self-determining activity, and from this concept deduce in turn laws of conduct applicable without restriction to all rational or self-determining agents as such, irrespective of the special peculiarities of their physical environment and animal nature." In other words, he would not base ethics on metaphysics as Kant and his followers do. "Any really fruitful inquiry after an ethical ideal or ethical principles," he says, "must be based not merely on an analysis of the formal characteristics of moral action, but upon an examination of the actual circumstances of the material and social environment of the human race, or, in other words, that ethics must study man not merely as an intelligence, but as an animal dwelling on the surface of a particular planet under certain definite physical surroundings, and inheriting certain peculiar instincts, and as a member of a species having certain special ways of obtaining nourishment and of reproducing his kind. All attempts to create a universal system of ethical principles, applicable not only to mankind but to all intelligent and self-determining agents, must be mere waste of time."

In other words, ethics is from Mr. Taylor's point of view, "an empirical or natural study as much as physiology or psychology. But it does not follow from this that metaphysical philosophy and ethics have nothing to do with each other, or that there is no such thing as a 'Metaphysics of Ethics.' . . . Our complaint

against the metaphysical moralists is simply this, that they invert the real order of dependence between the two branches of inquiry, and make the 'Metaphysics of Ethics' the beginning, instead of the end, of an examination of morals."

In this practical manner and in seven chapters bearing the titles, "Metaphysical Ethic," "The Roots of Ethics," "The Types of Virtue," "Moral Ideals and Progress," "Pleasure, Duty, and the Good," "The Goal of Ethics," "Beyond Good and Bad," Mr. Taylor has considered the ethical problem under its most manifold aspects; and both his processes of reasoning and the results he has reached will be found deserving of careful attention. *μ.*

CHRISTIANITY AND MYTHOLOGY. By *John M. Robertson.* London: Watts & Co., 17 Johnson's Court, Fleet Street. 1900. Pages, xviii, 484. Price, 8s. 6d.

Mr. Robertson has given us in this work a comprehensive study of the origins of Christianity considered from a mythological point of view. A myth, according to him, is "simply a false hypothesis (whether framed in bad faith or in good faith) which once found easy credence; and when inadequate or illusory hypotheses find acceptance in our own time, we see exemplified at once the play of the myth-making faculty and that of the normal credulity on which it lives.

"Any 'explanation' which is but an *a priori* formula to account for an uncomprehended and unanalysed process of phenomena is a 'true myth' in so far as it finds utterance and acceptance. Some myths are less fortuitous, more purposive, than others; and a question might be raised as to whether there is not here a true psychological distinction. My answer is that we can never demonstrate the entire absence of purpose: it is always a question of degree; and it makes little scientific difference in our elucidation whether we impute more or less of ignorant good faith, provided we recognise variation. A quite primitive myth may have been a conscious fiction on the part of its first framer; but the credulity of its acceptors assimilated it in exactly the same way as others framed in better faith."

Mr. Robertson's studies are the outgrowth of fifteen years of inquiry. They "set out with a certain scientific principle and a certain historical purpose: the principle being that Christian Origins should be studied with constant precaution against the common assumption that all myths of action and doctrine *must* be mere accretions round the biography of a great teacher, broadly figured by 'the' Gospel Jesus; while the practical purpose was to exhibit 'The Rise of Christianity, Sociologically Considered.' To that end I was prepared to assume a primitive cult, arising in memory not of a great teacher but (perhaps) of an obscure thaumaturg, concerning whom there is preserved, in the Epistles of Paul, only the tradition of his crucifixion. But the first independent explorations, the first rigorous attempts to identify the first Jesuits, led to a series of fresh exposures of myth. 'Jesus of Nazareth' turned out to be a compound of an already composite Gospel Jesus, an interposed Jesus the Nazarite, and a superimposed Jesus born at Nazareth. And none of the three aspects equated with the primary Jesus of Paul. Each

in turn was, in Paul's words, 'another Jesus whom we have not preached.' And the Twelve Apostles were demonstrably mythical." When he was continuing his studies, he was gradually led to the concept of mythology as a more catholic science, or a more scientific classification of certain knowledge, than it had yet been shown to be in the hands of its cultivators, admirable as much of their work had been. He has set forth this view critically and historically in the opening treatise of the present volume, on the "Progress of Mythology," and has continued the research in a treatise on "Christ and Krishna," with a view of solving objectively and scientifically a simpler general problem in mythology and hierology. In the third part, he has considered successively from his special point of view the many Gospel myths. His conclusion is: "If our analysis of the Gospels as a congeries of myths be broadly accurate, there has been set up not merely a set of more or less sound and tested propositions in place of an aggregate of delusion, not merely a certain body of historic truth in place of much primitive error, but a sustaining and 'constructive' conception of human history in place of one profoundly destructive and dispiriting. The champions of the traditional view of the Gospels are the truly negative teachers: they insist to the last that the records represent either a supernatural or a supernormal exhibition of moral greatness; that it needed either a God or a man beyond all compare to give forth such teachings; they imply that only by such moral cataclysms has humanity ever been bettered; and they further imply that there is either no chance or little chance of comparable betterment in the future. It is such teaching as this that peculiarly deserves to be branded as perniciously negative, in that it negates the moral faculty of all mankind. To apply the phraseology of the Christians of past time, it is a blasphemy against Man. It has cast a glamour of mystery round some ancient portions of men's handicraft, and has so taught later men to despair of their own powers. If our 'negation' be just, it establishes the momentous affirmation that as Man is the maker of all Gods, so is he the maker of all Christs."

HINDU LOGIC AS PRESERVED IN CHINA AND JAPAN. By *Sadajiro Sugiura*. Edited by *Edgar A. Singer, Jr.* Published by the University of Pennsylvania. 1900. Pages, 114.

This monograph forms Number 4 of the "Series in Philosophy" publications of the University of Pennsylvania and is a dissertation offered by the author in partial fulfilment of the conditions for securing the degree of Doctor of Philosophy at that University.

Hindu logic, usually known as *Hetuvidya*, or the science of reasoning, has, since the introduction of Sanskrit literature into the West, excited a particular interest in connexion with Indian philosophies. The *Hetuvidya*, especially the new system of Mahâdinnâga, shows a great similarity to the Aristotelian formulæ of reasoning, and this fact has induced some scholars to think that the Indian invasion of Alexander the Great brought the Eastern syllogism into Greece, and that the

latter was elaborated by the Stagirite into the form we have at present. But the conjecture, which is in itself absolutely absurd from the fact that Alexander did not invade India until four years before Aristotle's death, is further slightly weakened by the circumstance that Mahâdinnâga lived seven hundred years after Aristotle. We may say that wherever there are analogous conditions intellectually or physically, we have always analogous results. But it may perhaps in the distant future fall to the lot of some learned scholar to prove laboriously that Mahâdinnâga may under the circumstances have owed something to Aristotle.

The author of the present pamphlet first reviews the six systems of Hindu philosophy in a brief introduction, beginning with the Sâmkhya school and ending with the Nyâya whose special pride lies in its important contribution to the development of Hindu dialectics. He then proceeds to the subject proper, first referring to the supposed founder of the *Hetuvidya*, whose name is known in the East as "Socmock" (Sokumoku = Akshapâda). We know absolutely nothing about his life; and like all the other ancient Indian thinkers, his date is veiled in obscurity. But the path first trodden by him was soon followed and improved by a number of Buddhist scholars. There must have been some other eminent logicians among other schools of philosophy besides Buddhism, but as the *Hetuvidya* is known in Japan and China only through Buddhist scholars, we are not in a position to ascertain what valuable contributions were made by Brahmans or Sâmkhyans. We can understand, however, through Buddhist literature, how prevalent the practical application of the principles of the *Hetuvidya* was among Indian thinkers, and with what vigor and sharpness one was engaged to prove or disprove a statement against the other. Following this example, Hindu logic is still diligently studied by Mahâyâna Buddhists in the far East.

Akshapâda's formula is called the "old system." The "new system" was formulated by Dinnâga, which is much simpler and more to the point than the old one. And this is the logic that constitutes the chief subject of investigation in the brochure before us. The documents utilised by the author are entirely in Japanese or in Chinese, and are generally inaccessible to Western scholars. The editor therefore has taken a very laudable step in bringing the present essay before the public.

The author has evidently worked under great difficulties to make the subject intelligible enough to English readers, and it remains for us but to congratulate him on his fair success. But if we may be allowed to point out a few shortcomings, trivial in character, yet irritating to those who are well acquainted with the subject, we should mention the following: The system of transliteration and pronunciation of Chinese characters is unwarrantable. We cannot see why the author has preferred the *Kwan* pronunciation (*Han* in Chinese) to the *Go* pronunciation (*Wu* in Chinese), while the latter method is almost exclusively used in the Buddhist and Hindu literature preserved in Japan. To take some examples from the text: *Muchak* (Sansk., *Asanga*, not *Asangha*) should be *Mu-jaku*; *Seish* (Sansk.,

Vasubandhu, not *Vasubhandu*) should be spelt *Seshin*; etc. But the importance of the subject-matter outweighs all these minor defects. T. S.

FRAGMENTS OF A FAITH FORGOTTEN. Some short sketches among the Gnostics mainly of the first two centuries,—a contribution to the study of Christian origins based on the most recently recovered materials. By *G. R. S. Mead, B. A., M. R. A. S.* London and Benares: Theosophical Publishing Society. 1900. Pages, xxviii, 630. Price, 10s. 6d. net.

The writing of the present work has been a congenial task to Mr. Mead, and he has brought to bear lovingly and zealously upon the portraiture of the figure of Christ and of early Christianity, all the knowledge which a deep study of Oriental religions from their emotional side could furnish. The book is published by the Theosophical Publishing Society, and bears of course the marks of its associations; but it may be stated at the outset that there is very little of what is commonly regarded as the Theosophic method apparent in the work, which is the product of a scholarly though withal very devotional spirit.

Mr. Mead's aim has been to enable the reader to obtain a glimpse of a world of which he has never heard at school, and of which no word is ever breathed from the pulpit; to take him away from the pictures which the rationalists and the apologists have presented, and to enable him to obtain an unimpeded view of that wonderful panorama of religious strife which the first two centuries of our era presented. He will here see "a religious world of immense activity, a vast upheaval "of thought and a strenuousness of religious endeavor to which the history of the "Western world gives no parallel. Thousands of schools and communities on "every hand, striving and contending, a vast freedom of thought, a mighty effort "to live the religious life. Here he finds innumerable points of contact with other "religions; he moves in an atmosphere of freedom of which he has previously had "no experience in Christian tradition. Who are all these people—not fishermen "and slaves and the poor and destitute, though those are striving too—but these "men of learning and ascetic life, saints and sages as much as many others to "whom the name has been given with far less reason?"

The task will be, the author says again, "to point to certain considerations "which may tend to restore the grand figure of the Great Teacher to its natural "environment in history and tradition, and disclose the intimate points of contact "which the true ideal of the Christian religion has with the one world-faith of the "most advanced souls of our common humanity,—in brief, to restore the teaching "of the Christ to its true spirit of universality. Not for one instant would we try "to lessen the reverence and the love of any single soul for that Great Soul "who watches over Christendom; our task will rather be to point to a soil in "which that love can flourish ever more abundantly, and ever more confidently "open its heart to the rational rays of the Spiritual Sun. That soil is rich enough "for the full growth of the man-plant; it is part of the original soil, and gives

"nourishment to every branch of man's nature, emotional and moral, rational and "spiritual."

In his endeavor to realise the object which he has set himself, Mr. Mead has traversed a vast field. Beginning with the Greece of 600 B. C., with its philosophies and mysticisms, with Egypt and its mysticism, with the systems of Philo, with the thought and civilisation of Jewry and Alexander, he considers general and Gnostic Christianity, the various sects of the Ebionites, the Essenes, the Ophites, etc., the individual doctrines and systems of Dositheus, Simon Magus, Menander, Saturninus, Marcion, Valentinus, etc., etc. We have then many pages devoted to traces of the Gnosis in the non-Canonical acts, to the Greek original works in Coptic translations, the Pistis Sophia, the book of the great Logos, the Akhmim Code, etc.; and finally, there is a bibliography. In fine, we have in this volume "a bird's eye view of the whole field of early Gnosticism," written for the general reader in a style and method requiring no knowledge of the ancient tongues, —all considered from a special point of view. It is designed as a pioneer sketch only, and the author hopes at some time in the future to be able to publish a large work comprising a number of volumes to be called *Round the Cradle of Christianity*. μ.

SCIENTIFIC ROMANCES. By *C. H. Hinton, B. A.* London: Swan Sonnenschein & Co., Ltd., Paternoster Square. Vol. I., 1886. Pages, 229. Price, 6s. Vol. II., 1896. Pages, 177. Price, 6s.

Mr. C. H. Hinton has kindly sent us his *Scientific Romances*,[1] in two volumes, published several years ago, and calls our special attention to his essays on the Fourth Dimension. We believe that space has infinite directions and that the assumption of three dimensions so called are nothing but the most economical way of determining space relations.[1] Systems of 4, 5, or *n* dimensions are abstractly conceivable, and their conception is useful to mathematicians as a generalisation which introduces a higher and more comprehensive point of view. There are difficulties and intricacies connected with the mathematical notion of a space system that presents a greater manifoldness than three dimensions, but for that reason the generalisation is legitimate for its purpose and within its limits as a generalisation, but if the idea of spaces of more than three dimensions is taken seriously, if they are thought as representing a reality, we venture into dreamland,—and it is a domain the possible form of which we cannot even conceive in our imagination.

Mr. Hinton's position may be characterised by the concluding paragraph of his essay on many dimensions. He says:

"There are two sides of religion,—the inductive and the deductive. To the realm of deduction belongs theology, with its central assertion and its manifold consequences. But inductive religion consists in grasping, amidst the puzzling

[1] See *Primer of Philosophy*, pp. 99–103. Compare *Fundamental Problems*, pp. 61–73.

facts of life, those greater existences in which the individual organisations are bound up, and which they serve, passing, as in every science, from the details to the whole. And the connecting link between materialism and the conduct of life, lies in the doctrine of the limited nature of our present space perceptions. For, with the elevation of our notion of space to its true place, the antagonism between our present materialistic and our present idealistic views of life falls away."

As to space he says:

"When in our space we have explained all that we can explain by the supposition of particles moving in our space, we shall find that there is a residuum, and this residuum will be explained by the four-dimensional movements of the minutest particles. The large movements are simply movements in three-dimensional space, but to explain the residual phenomenon a higher kind of space will be requisite."

And in another place he argues:

"If a fourth dimension exists, there are two possible alternatives.

"One is, that there being four dimensions, we have a three-dimensional existence only. The other is that we really have a four-dimensional existence, but are not conscious of it. If we are in three dimensions only, while there are really four dimensions, then we must be relatively to those beings who exist in four dimensions, as lines and planes are in relation to us. That is, we must be mere abstractions. In this case we must exist only in the mind of the being that conceives us, and our experience must be merely the thoughts of his mind,—a result which has apparently been arrived at, on independent grounds, by an idealist philosopher.

"The other alternative is, that we have a four-dimensional existence. In this case our proportions in it must be infinitely minute, or we should be conscious of them. If such be the case, it would probably be in the ultimate particles of matter that we should discover the fourth dimension, for in the ultimate particles the sizes in the three dimensions are very minute, and the magnitudes in all four dimensions would be comparable.

"The preceding two alternative suppositions are based on the hypothesis of the reality of four-dimensional existence, and must be conceived to hold good only on that hypothesis.

"It is somewhat curious to notice that we can thus conceive of an existence relative to which that which we enjoy must exist as a mere abstraction." P. C.

TALKS ON CIVICS. By *Henry Holt*. New York: The Macmillan Co. 1901. Pages, xxvi, 493. Price, $1.25.

Mr. Henry Holt has attempted in the present dialogues to rescue the method of Socrates and Plato from the nocuous desuetude into which it has fallen and to apply it to the resolution of the practical problems of politics and government now presenting themselves to the young voters of the United States. The aim he has set himself is "to develop in young people the character of mind which is proof against political quackery." "Of all our hard-bought institutions," he says, "there

is scarcely one, from a stable currency down to the very right of accumulating property, that has lately escaped a strong attempt to overthrow it, and to substitute for it some invention of the moment,—or rather some invention bearing a name of the moment, but being really a form of some protean error as old as history."

The point that Mr. Holt makes is that since all these political errors propose to get along faster than evolution, they are by their very nature impossible to a mind habitually recognising the law of evolution. Hitherto, but one or two American elementary text-books on civic subjects have sought in any way to emphasise the developmental character of institutions and forms of government, and so Mr. Holt's work has taken the shape of a deliberate "attempt to saturate young people's minds with the realisation that social institutions are evolutions, and therefore (1) that they can no more be modified by laws or votes or any other manifestations of human will than plants or animals can; but (2) that they *can* be modified *as much* as plants or animals can, though only by the same means,—careful study of their life-histories and habits, and cautious efforts in accordance with the improved conditions of their well-being; and (3) that they will be vitiated or destroyed by forced or ignorant treatment." This is the reason he has spent so much time over such topics as early land tenure, the nature of contracts, or, to use his own phraseology, over "the archæology of the subject." "I want to give the pupil," he says, "a consciousness that enduring institutions are growths, and do not spring up responsive to any magician's wand, be it in the hands of Mr. Altgeld, Mr. Bryan, or even so good a man as Henry George,—I want to accustom him, when any method is presented for his vote, to ask: Has this thing roots?" And above all he has sought to place before American youths at least one text-book "that should not claim that our constitutions—state and national—present the final word of human wisdom."

To accomplish his various purposes, Mr. Holt has spared neither pains nor space. The conversations are simply worked out, the illustrations which he has adduced are practical and pertinent; in the main, the arguments on both sides of the subject have been fairly and forcibly presented; and while the author's opinions on most economic and administrative subjects tend toward ultra-orthodoxy, his opposition is not unfraught with suggestiveness even to his opponents, and his liberal adoption and popularisation of the results of scientific economic research, not to speak of his comparative analyses of the best specimens of the institutions which foreign countries have to offer, will be of the highest value to all persons desirous of becoming thoroughly acquainted with the exigencies of present American politics. *μ.*

Reconstruction in Theology. By *Henry Churchill King*, Professor of Theology in Oberlin Theological Seminary. New York: The Macmillan Co.; London: Macmillan & Co. 1901. Pages, xiii, 257. Price, $1.50.

The present work is a sincere and deeply religious attempt to reconstruct theology so as to bring it into closer conformity with the "changed intellectual, moral,

and spiritual world in which we live." The writer deems it possible "to avoid the great breach between the scholars of the Church and its membership, such as confronts Germany to-day." In the author's judgment, the result of all that modern science, inclusive of the theory of evolution, has done for theology is not revolutionary of anything that is vital to the highest Christianity, but tends rather to show a distinct trend toward a deeper appreciation of Christ's own point of view. It is with this purpose that special attention has been paid to the question of miracles, of the bearing of evolution on theology, and the influence of the historical and literary criticism of the Bible.

Professor King's position with regard to evolution is scarcely in harmony with what science teaches. The evolution of science he would call "evolution in its narrower scope." "A consistent view of evolution," he says, "must recognise the human stage, with its personal relations. We have no call to show that in these personal relations of men with men, or of God with men, all that occurs can be brought under the laws that hold on the lower stages." His attitude with respect to miracles is also not in accord with the view even of the advanced scientific school of theology represented by Pfleiderer, which excludes miracles in every sense of the word, nature-miracles as well as spirit-miracles. To Professor King the miracle is not the "isolated wonder" of Huxley. He says with Dr. Denison: "The miracles do not stand by themselves; they are profoundly significant; they "are a part of a vast and orderly spiritual movement, and those who have per- "ceived the significance and order of that movement, or who have experienced "even in a small degree its causation, have found in these things the strongest and "most rational evidence for a miraculous dispensation. It is true that this evi- "dence cannot be imparted by a brief process to a man destitute of spiritual per- "ception or experience, but that does not invalidate the rationality of the evidence; "it puts a premium just where it should be put, on spiritual culture."

We have made the foregoing quotations in order to characterise Professor King's attitude toward the important problems involved in the reconciliation of theology with science. While some truth will be found in the attitude of Professor King and Dr. Denison, it still remains the old point of view of Cardinal Newman, and leads logically to the espousal of the tenet of infallibility of the Church of Rome. The Protestant Church will, in our opinion, ultimately adopt, and be necessarily forced to adopt, the position of Pfleiderer. *μ.*

THE FIRST INTERPRETERS OF JESUS. By *George Holley Gilbert, Ph. D., D. D.* Professor of New Testament Literature and Interpretation in Chicago Theological Seminary. New York: The Macmillan Company. London: Macmillan & Co., Ltd. 1901. Pages, xiii, 429. Price, $1.25.

Proceeding on the assumption that the utterances of the first interpreters of Jesus, whose writings have been preserved in the New Testament, are vastly more important both as to the material they offer and the spirit in which they write than

those of any subsequent authors, Dr. Gilbert has set himself the task of ascertaining as accurately as possible "how Jesus and his revelation appeared to these men of the first century." He does not wish to place their interpretation before the Gospel itself, or to intimate that Christ, his life, death, and resurrection, is not infinitely more than any interpretation, even though it be apostolic and inspired; but he desires to get solely at the *facts* of the Christian scriptures, as distinguished from the peculiar points of view of the reporting authors. This task "is obviously historical," says Dr. Gilbert, "for it is nothing else than the investigation of a number of ancient Greek writings. The sole aim of the student who undertakes this task—and therefore our sole aim—is to learn the moral and religious views which these ancient Greek writings contain. It is not to defend these views. It is not to show their harmony or lack of harmony with the revelation of Jesus, or with the teaching of the Church in subsequent ages. The solitary question with which we here approach these documents is the question of fact—What do they teach?"

But, as we have intimated before, the emphasis is to be placed upon the facts taught, and not upon the point of view either of the original authors or of modern theology. "Our question is not," says the author, "What does John or Paul teach regarding God, or sin, or immortality, the Church, or the sacraments, or any other particular topic of religion or morals? If we had access to the living writers, we might take our theological categories along and ask them to give us their thought on the various subjects; but instead of the living writers we have some of their writings only, and we cannot assume that when they composed these they had in mind any of our mediæval or modern 'skeletons' of theology. We cannot hope, then, to do justice to any one of these writings if we go to it with a set of specific questions, and search out the words in it which bear upon this or that topic. A procedure of that kind is not interpretation, but is rather a violent attempt to make the New Testament authors think and speak according to our notions of Christian truth. This method is not historical."

The author has endeavored to accomplish his task in twenty brief chapters, nine of which are devoted to the teachings of Paul, five to the teachings of the minor writers, James, Peter, Jude, Hebrews, and the remaining chapters to the teachings of John and to the Apocalypse. The book, which is written from the purely orthodox point of view, has excellent indices. *μ.*

BIRTH A NEW CHANCE. By *Columbus Bradford.* Chicago: A. C. McClurg & Co. 1901. Pages, 363. Price, $1.50.

Some time ago the editor received from the author of this book the following letter:

"I write to call your attention personally to a book of which I am the author —*Birth a New Chance.* I think possibly it may be of special interest to you, inasmuch as it was first entitled *Whence and Whither?* and had to be changed because of your own work bearing that title having got on the market ahead of mine.

My publishers would not accept my title because of your book. I purchased and read your book as soon as I noticed the title. I like your treatment of the inquiry, for the most part. It is rather disappointing to find you stopping short of a hope of individual immortality. From my work you may possibly get a suggestion on which you may yet be able to found a hope of personal persistence beyond death.

"I think a copy was sent *The Monist*, and a review of it may ere this have appeared in that magazine. I think you would find my book sufficiently vivacious in style for even vacation reading. Kindly let me know if you will receive a personal copy and examine it as soon as convenient."

The book was duly received, and I found that it contains a peculiar and new conception of regeneration. The author ventures into fields where a man accustomed to the strict methods of science would not be apt to follow him; but his arguments are interesting, and the flight of his fancy is bold. No doubt his ambition to solve the problem is as keen as my own, and on going over his book I wish to represent his arguments with impartiality, the more so since I cannot accept his views. I believe that many of our readers will be glad to become acquainted with an author who does not walk in the beaten tracks. I limit myself strictly to quotations, which I hope will be a fairly good sketch of the author's belief.

Mr. Bradford says:

"The human race is a growing race, in process of rising from animalhood to angelhood.

"Whatever of a Paradise or Eden he may have had before his fall, he can never have any higher heaven than this earth till he quits dying.

"To live is to live, and to be dead is to be dead. When a human being consciously dwells in a vital organism, called a body, he is alive. When his body collapses and dissolves, he is dead, and remains dead till he lives again in a new, organised vital body.

"The human personality, whether called the soul or the spirit, does not go out of the body at death, but retreats within the body, back into the germ from which that body grew, and from which, provided the "deeds done in the body" were not such as to destroy its vitality, there is ground to infer that another body will grow.

"This germ, or seed, into which the soul retreats at death answers well to the Apostle Paul's metaphor (1 Cor. xv. 37) of the 'bare grain,' which, he declares, is the only part of the body that is buried that will be in the new body when the dead person lives again.

"But 'flesh and blood cannot inherit the kingdom of God;' that is, cannot evolve a spiritual body from the present natural body. So, at the 'last day,' 'in a moment, in the twinkling of an eye,' the dead shall be raised incorruptible, and the living shall be changed. But from all the examples furnished—those of Jesus, Lazarus, the daughter of Jairus, and the widow of Nain's son—we have reason to infer that there will be no dead at the last day except in well-preserved bodies.

"An individual lives again after death by being born again, and he is born again by virtue of having during his life maintained sympathetic connexions with his race. By deeds of kindness and mercy to his fellows, even on a small scale, he maintains this sympathetic connexion and comes under the operation of a law as unfailing as gravitation, which draws back the soul-seed of the dead man into the warm life-currents of the living race, and so assures his being born again.

"We live again, therefore, because of pity more than because of piety.

"Since no individual is wholly saved till he quits dying, there is no hope of individual salvation apart from race salvation.

"In this sense, all who die die unsaved.

"This race redemption from death is to come through a purification of our common hereditary stream. Hence the importance given in the Bible to a scheme of blood salvation. The perfection of the race on earth is to come by getting all its members so well born they will not need to die or be born any more. This is what Jesus called 'The Regeneration' (Matt. xix. 28; Mark x. 29, 30); Greek, *Palingenesia*, meaning, literally, 'the born-again era.'

"But, so far as we can observe, nothing material leaves the person when the breath ceases at his death. The matter of which he is composed will weigh precisely as much the moment after as the moment before his death. The material atom from which he grew goes back into the earth whence it came, and if the same individual ever has another corporeal existence there is strong ground for the inference that it will be a growth from the same seed he grew from before, and by virtue of the same agency,—reproduction.

"I recall a tradition concerning the historic Roger Williams which suggests one possible way, whether the actual way or not. It is stated that an apple-tree grew up at the head of the grave in which Mr. Williams was buried. Sometime in the after years this apple-tree was dug up, and it was discovered that the roots of the tree had played a kind of freak by following the course of the disintegrated body in the grave. A large root had formed in the trunk of the body, and then forked and followed the course of the two legs, So practically the whole body of Roger Williams had turned into the root of an apple-tree.

"The article relating this tradition was headed, 'Who ate Roger Williams?' It was scientifically assumed that many of the properties and particles of the body of Williams had entered into the apple-tree, and some of them into the apples that grew on the tree, and that therefore whoever had eaten those apples had, in a way, eaten Roger Williams. This, I say, suggests at least a possible way for the homo-seed to pass from a dead and decaying body, through the medium of the vegetable kingdom, into a living body of its own species.

"But if this illustration strikes you as too cannibalistic, there are several ways whereby a soul, sealed up in a mere germ, may pass into the life currents that flow through some living body, and thus take its first step towards a renewed conscious and corporeal existence. We need only to think of this life-germ, this precious

soul-seed, as having a strong natural affinity for living human bodies, and so being drawn to those bodies by invisible life forces, as soon as its former body becomes sufficiently dissolved to release it. In cases of cremation this seed is doubtless released at once into the atmosphere, and is free to enter immediately into the soil to which it is specially indigenous; that is, into some living human body. We are told that we are constantly receiving into our bodies living germs of various kinds, and it is natural to suppose that human germs may find admission with the others.

"During the life of the body the soul gives constant evidence of the possession of a native instinct to preserve its body. This is strong enough in times of great peril to inhibit the function of the objective faculties, and cause the soul to lift the body and carry it out of danger. If it can exert itself thus for the preservation of its body during life, we have reason to believe that it can and will exert itself in some way for the rehabilitation of its body after death. If it can convey a living body out of danger, it can surely carry the seed in which it dwells till it finds a matrix in which to rebuild its body.

"But even if it were without this instinct, and should become after death merely a passive seed in the earth, the constant commerce going on between the earth and living human bodies would guarantee sooner or later the entrance of that seed into some living human body. And once having entered a living body, the organic machinery of that body will assign it to its proper place.

"That normal and matured human bodies do carry such seeds in their loins we are certain, and to my mind it seems more likely that they emerge from the earth instinct with life and find their lodgment in living bodies than that they are originally formed in those bodies. We call the propagation of our species *re*-production, which means producing over again. If the seeds from which members of our race are now growing are formed for the first time in the loins of their progenitors, then we should speak of the production rather than of the *re*-production of the species.

"Let us now direct our attention to some of the sayings of Jesus which seem to be explicable on no other ground than that of this hypothesis, that when we die our only hope of living again is in being born again. In order to make sure of living again in this way we must during our present life maintain sympathetic connexion with our race by deeds of kindness, helpfulness, and loving service.

"Jesus said:

"'And I say unto you, make yourselves friends of the mammon of unrighteousness; that when ye fail, they may receive you into everlasting habitations.'

"Jesus seems here to aim at giving the philosophy of the operation of the law of helpfulness which he so often enjoined. The friends we make by a beneficent use of money are to have something to do in bringing about our immortality. It seems to be this way:

"By observing this law of helpfulness we maintain sympathetic connexion with our race, so that when we 'fail,'—that is, die and dissolve,—the sympathetic

connexion we have established will draw the 'bare grain' in which each of us resides back into the life currents of living men, and enable us to live again and again until we, with the rest of the human race, attain immortal and spiritual bodies,—'everlasting habitations,' or 'eternal tabernacles,' as the Revised Version renders it.

"This same principle Jesus makes the basis of the general judgment. Condemnation of the lost is based upon sins of omission rather than sins of commission, and sins against man rather than against God. The mere neglect to minister to one's suffering fellow-beings is sufficient to sever the sympathetic connexion on which one depends to get back into life, and so there is no recourse for such a one but to remain forever bodiless in 'outer darkness.' This is also the danger Jesus so often referred to as threatening the rich man, the danger by a selfish life of making it impossible ever to live again. 'How hardly shall they that are rich enter into the kingdom of heaven.' To enter into that kingdom Jesus told Nicodemus that it was necessary to be born again; and the severing of sympathetic connexion with one's race by a selfish life will make such a new birth impossible.

"As my working hypothesis, I have adopted this: That every individual member of the human race lives more than one lifetime in this world, beginning each lifetime in the same way,—by being born,—and ending each by dying; that each individual will continue to do this till he rises above the necessity of dying, or sinks below the possibility of living."

The author concludes his book with the following sentences:

"Let us teach men that spiritual living will produce concrete results in this present world,—that it will in a few generations destroy death. In other words, let us teach men that if they will live after the spirit rather than after the flesh, they shall in due time see on this very earth a literal fulfilment of the prophecy in Revelation xxi. 4:

"'And God shall wipe away all tears from their eyes; and there shall be no more death, neither sorrow, nor crying, neither shall there be any more pain: for the former things are passed away." P. C.

Die Wirkungen des Geistes und der Geister im nachapostolischen Zeitalter bis auf Irenäus. Von *Heinrich Weinel*, Lic. Theol., Dr. Phil. Freiburg i. B., Leipzig and Tübingen: Verlag von J. C. B. Mohr (Paul Siebeck). 1899. Pages, xii, 234.

The present volume is an investigation of an important feature of the early Christian congregations, viz., their belief in the operations of spirit and spirits. To the early Christians the idea that they had to struggle, not with men nor with worldly authorities, but with powerful spirits, was not an empty phrase but a most tremendous reality. They believed in the existence, not only of the kingdom of God, but also of a demoniacal empire, and the existence of evil spirits was fully proved to them by experience; for all error, all diseases, all heresies, all tempta-

tions, all sufferings, were simply the effects of spiritual causes. And they learned to battle against the prince of the world and his satanic helpers through their faith in Christ. Dr. Weinel, of Bonn, goes over the historical material, and describes the mental attitude of the early Christians and the various phenomena resulting therefrom. He discusses the speaking in tongues, the so-called *glossolalia*, ecstatic singing and praying, inspired authorship, miracles, the healing of diseases, the laying on of hands, spiritual audition, vision, and intuition, the effects of spiritual taste and touch, as well as other hyper-æsthetic conditions.

The reader might have expected the author to enter into a critical discussion of these pneumatic phenomena from the standpoint of modern therapeutics and psychology, but Dr. Weinel restricts himself to a purely historical treatment of the subject; he says that the phenomena discussed by him will excite the astonishment and interest of the reader by their strangeness and eccentricity, but will at the same time elicit his admiration and reverence on account of the powerful energy with which death, devil, and world are conquered. The task of treating the same subject from the standpoint of psychology, or even of utilising it for practical religious purposes, he declines as not lying within his sphere.

The book contains a great amount of interesting facts and shows good judgment and a mastery of the subject. P. C.

Die metrischen Stücke des Buches Jeremia. Reconstruiert von *Dr. Carl Heinrich Cornill*, Professor der Theologie an der Universität Breslau. Leipzig: J. C. Hinrichs'sche Buchhandlung. 1901. Pages, xiii, 40. Price, 1.50 M.

Professor Cornill, the editor of the prophet Jeremiah in the *Polychrome Bible*, was, when compiling the Hebrew text, under the impression that the *Polychrome Bible* should serve simply as a condensation of the present standpoint of Bible criticism for the use of laymen; and thus he removed only the most obvious mistakes, leaving untouched all passages which, though doubtful to the critic, could be tolerated for the ordinary needs of devotion. Noticing that the *Polychrome Bible* is not for the layman alone, but for the scholar, that it is intended to proclaim from the house-tops the results of scientific investigation, if they only be firmly established, he proposes to adjust the shortcomings of his text in the translation which is soon to appear, by adding a special sheet of text explanations. His manuscript was handed in long ago, and in the meantime several new investigations have appeared, among which Professor Duhm's work is not the least important; and so Professor Cornill deemed it wise and justifiable to publish the result of at least a part of his text criticism in the present collection of the metrical passages of the prophet. Hebrew scholars will be the more interested in it as Jeremiah will be utterly misunderstood if the text were understood to be prose; and a critical sifting of the Hebrew original with a special view to its metrical passages is apt to prove important results as to our judgment of the nature of the book and the char-

acter of its author. Thus, this collection of the Hebrew text revision of Jeremiah will be an important and indispensable addition to the Hebrew text edition of the Book of Jeremiah, especially to the author's edition of the *Polychrome Bible*. The layman who does not know Hebrew will not directly, but indirectly, be benefited by the results which can be drawn from an appreciation of the poetical spirit of this most sympathetic figure among the prophets. P. C.

PROCEEDINGS OF THE ARISTOTELIAN SOCIETY. Containing the papers read before the Society during the Twenty-Second Session, 1900–1901. London: Williams & Norgate. 1901. Pages, iv, 239. Price, 10s. 6d. net.

The papers of the Aristotelian Society have always been of interest from the point of view of technical philosophy, and many of them have contributed even to the definitive elucidation of metaphysical problems. They deserve, therefore, the attention of students, for whose benefit we here append a list of the titles: I. Presidential Address—The Common-Sense Conception of a Material Thing, by G. F. Stout; II. On the Aspect Theory of the Relation of Mind to Body, by E. C. Benecke; III. The Conceptions of Cause and Real Condition, by Shadworth H. Hodgson; IV. On Some of the Phenomena of Poetic Effectiveness, by E. H. Donkin; V. Art and Personality, by Henry Sturt; VI. The Substance-Attribute Conception in Philosophy, by Shadworth H. Hodgson; VII. Identity, by G. E. Moore; VIII. Italian Philosophy in the Nineteenth Century, with Special Reference to the Place of Francesco Bonatelli, by James Lindsay; IX. A Scientific Monism, by Arthur Boutwood; X. The Meaning of Sameness, by Miss E. E. Constance Jones; XI. The Pseudo-Science of Æsthetics, by Alexander J. Finberg; XII. The Theory of Subjective Activity, by H. Wildon Carr; XIII. The Belief in External Realities, by G. Dawes Hicks; XIV. The Conscious Being, by Shadworth H. Hodgson.

We could only wish that the price of the volume were less.

LA SÉRIE DE TAYLOR ET SON PROLONGEMENT ANALYTIQUE. Par *Jacques Hadamard*. Paris: C. Naud. 1901. Pp., 100. Price, 2 francs.

PRODUCTION ET EMPLOI DES COURANTS ALTERNATIFS. Par *L. Barbillion*. Paris: C. Naud. 1901. Pp., 103. Price, 2 francs.

These two little volumes, neatly and æsthetically bound in flexible covers, are the May issues of *Scientia*, a serial publication edited by some of the foremost *savants* of France and devoted to the systematic philosophical consideration of the scientific questions of the day, as distinguished from the fragmentary and specialised treatment which they are accorded in the technical periodicals. For instance, M. Hadamard in six chapters, to each of which he has supplied an exhaustive bibliography, has considered all the new researches that have been made in connexion with that powerful engine of modern analysis, Taylor's Series, and with its application to the discovery of analytic functions constituting the solution of

such problems as the integration of algebraic differential equations. And M. Barbillion has performed a similar task on the physical side for alternating currents. Both essays are masterful expositions, and in so far as the difficult mathematical nature of their respective subjects permits, they are simply and lucidly written. They harmonise, in fine, with the general character of excellence of this series, to which the most widespread attention should be called.

American Diplomatic Questions. By *John B. Henderson, Jr.* New York: The Macmillan Company. London: Macmillan & Co., Ltd. 1901. Pages, ix, 529. Price, 10s. 6d.

This large volume, without preface, statement of purpose, or index, is a collection of essays upon the principal diplomatic questions which have occupied the attention of American statesmen and publicists. Five great questions have been exhaustively considered: I. The Fur Seals and Bering Sea Award; II. The Interoceanic Canal Problem; III. The United States and Samoa; IV. The Monroe Doctrine; V. The Northeast Coast Fisheries. Persons desirous of acquainting themselves thoroughly with these important chapters of American diplomatic history, many of which have still a present interest, will find Mr. Henderson's volume in every respect a satisfactory one.

Klassicismus und Naturalismus bei Fr. Th. Vischer. Von *Erich Heyfelder.* Berlin: R. Gaertners Verlagsbuchhandlung. Hermann Heyfelder. 1901. Pages, 86.

This little pamphlet, which is devoted to a consideration of the intellectual development of Fr. Th. Vischer, the great German æsthetician, is, in addition, a concise appreciative sketch of the entire æsthetic philosophy of Germany, from Kant to the latest times. The author does not omit even to connect his reflexions with the ancient systems, so that the brochure will be found altogether to make a very interesting reading in the history and theory of art.

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THE MONIST

MEDITERRANEAN CULTURE AND ITS DIFFUSION IN EUROPE.[1]

ANY ONE who in investigating European origins finds himself in that epoch which the French ethnologists with DeMortillet have called the Madeleine, an epoch which may be considered as the latest period of Paleolithic Europe, will be astonished to find artistic productions wonderful in their conception and in their technical execution. The cave bear of Massat near Toulouse, the mammoth of Madeleine, the reindeer of the cave of Thayingen near Lake Constance, the horses, the human figures, the buffaloes, and other animals sculptured in bone or in horn, and found plentifully in Dordogne, and finally the bas-reliefs of Brassempouy and of Mas-d'-Azil, recently discovered by Piette, all reveal the high character of the art of this ancient epoch so far removed from modern civilisation.[2]

According to an opinion which I have expressed elsewhere,[3] these prehistoric artists having the artistic sentiment so highly developed were the precursors of the historical artists who created the marvellous works of Egypt, of Greece, and of Rome. If it is true, as I think I have shown, that a stock coming from Africa was

[1] Translated from the manuscript of Prof. Giuseppe Sergi, of the University of Rome, Italy, by I. W. Howerth, Ph. D., University of Chicago.

[2] Cf. Wilson, *Prehistoric Art, or the Origin of Art as Manifested in the Works of Pre-historic Man.* Report of U. S. National Museum for 1896. Washington, 1898. In this volume all the discoveries of prehistoric Europe and America are brought together and presented in clear and beautiful figures.

[3] *Arii e Italici*, Turin, 1898.

diffused in the quaternary epoch throughout the whole Mediterranean basin and over Europe, even to the northern part; and if it is true that this stock, which we have classified as the Eurafrican species, continued its existence into the Neolithic epoch, and afterwards into the successive ages of metals, it is to this stock that we must attribute this artistic manifestation which later was to assume such wonderful forms, and to arrive finally at the summit of the classic arts of the Mediterranean. This idea was first suggested to me by the constant convergence of the physical characters of the primitive inhabitants of these regions, and the unity of the stock is confirmed by the persistency of the artistic tendency through such distant epochs.

The Neolithic age presents a singular uniformity from prehistoric Egypt to Scandinavia, from the British Islands to the Black Sea, and throughout the Mediterranean basin. This uniformity may be observed principally in the forms and ornaments of the ceramic art, and in the working of stone. It is presented also in that curious form of burying the dead grouped together and in a cramped position, except in a few cases, and in the cave sepulchres with rooms more or less artistic, of which I have spoken elsewhere. Such a uniformity suggests and confirms the anthropological unity of the various populations, which must have carried their customs and their arts along with them. This Neolithic age so uniform in its manifestations corrects in part the discontinuity of the Magdelenian, for, at least down to the present, the manifestations of this period are not so continuous or so extended as those of the Neolithic. It is natural, therefore, to suppose that in the quaternary period the population was not yet so numerous as in the Neolithic, or so diffused. Nor could it have yet developed in some localities the artistic tendency which is seen so advanced in others.

Of this epoch, so important in the history of humanity and especially in the history of the Eurafrican species, the most advanced of which is the Mediterranean, we have many interesting evidences in prehistoric Egypt and in the eastern part of the Mediterranean basin, in both of which places a very archaic and indigenous civilisation appeared.

The discoveries of Petrie, of Amélineau, and of DeMorgan show that prehistoric Egypt was not influenced by an Oriental civilisation. The real question is in regard to the civilisation called Egyptian *par excellence* or Pharaonic, which these authors and others believe to have been Asiatic in origin.

I have spoken elsewhere of this matter and concluded that the historical Egyptian civilisation is a continuation and an evolution of the prehistoric, and that there is no necessity of admitting that there was an Asiatic immigration. To be sure, all relations with Asia cannot have been excluded, on account of the proximity of Egypt to that region. The prehistoric Egyptian civilisation is purely Libyan, and in comparison with its contemporary European civilisation it was highly developed, as may be seen by its artistic products and by its exquisitely worked flints.

If we call to mind the facts revealed in Cyprus, my opinions concerning the origin of the Mediterranean civilisation will be found to be in large part confirmed. Ohnefalsch-Richter showed by new explorations in that island how ancient its civilisation was, that it was anterior to all Asiatic influence, as it was also anterior to the same periods of Hissarlik. Relations between the valley of the Nile and Cyprus have been affirmed, and there was indeed a civilisation common to them in prehistoric times and an exchange of products. This civilisation was not Asiatic but very ancient and autochthonous and may be called Afro-Mediterranean.[1]

The Asiatic influence came afterwards, perhaps after some thousands of years, if the first period of Cyprus is, according to Ohnefalsch himself, anterior to the last stratum of Hissarlik, which stratum, as it appears to me, ought not to be considered as Asiatic, although traced in the Troad, but Mediterranean. It is exempt from Mesopotamic and Hittite influences, and is, like the primitive Mediterranean civilisation and that of Cyprus especially, and this is what induced Ohnefalsch and Myres to consider it a Cyprian invasion.[2]

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[1] Cf. Ohnefalsch, *Neues über die Ausgrabungen auf Cypern.* Verhandlungen der Berliner Gesellschaft, 1899.

[2] *Op. cit.*, pp. 39–353, note 1.

It appears to me also that, as in the lower part of the eastern basin of the Mediterranean in Libyan Egypt, in the western regions of Asia Minor, also in the western Mediterranean and in Europe and the north of the great basin, the civilisation unfolding itself as Neolithic and then as Eneolithic, and with copper together with polished stone, was autochthonous and without eastern Asiatic influences. I think there may here be seen a unity, as in the Eur-African species, not, however, without some differences of development and of form which appeared in different regions on account of biological as well as regional causes. In Sicily Orsi has discovered evidence of a primitive civilisation analogous to that of the most ancient strata of Cyprus and Hissarlik, and it seems to me that in spite of analogies something has been found peculiar to that island, an independent production with its own peculiar characters. But there soon appeared in this island an Oriental importation followed by imitation.

I have been able to prove by means of observations upon the skulls found in the first or Eneolithic Sicilian period of Orsi, that there was in that remote epoch an eastern current setting toward the west and especially into Sicily, for in the midst of Mediterranean cranial forms I have found foreign forms which I judge to be Asiatic in origin, especially from the region of the Caucasus and Armenia.[1]

But while the presence of Asiatic heads in the western part of the Mediterranean basin proves its relations with the Orient, it does not contradict what I have said in regard to the purely Afro-Mediterranean civilisation being autochthonous. These foreign heads show only the tendency of the various populations towards the commercial centers, and hence an emigration to and the mixing with those who dominated in commerce. This is how I interpret the presence of foreign elements, especially Causasian and Armenian, in the Occident in so ancient an epoch, without any influence of civilisation, as is seen by the objects found, of which some are local products, others imported as articles of commerce.

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[1] "Cranii preistorici della Sicilia." *Atti. Soc. Romana di Antropologia* Vol. VI. 1899.

But that which must have transformed the whole physiognomy and developed the latent germs of Mediterranean civilisation was the invention of the metallic arts, copper and bronze. While from the discoveries in Egypt it seems that bronze was known there relatively late, it is noteworthy that Cyprus learned the use of copper at a very remote epoch. It appears at a period anterior to the latest stratum of Hissarlik. Ohnefalsch puts almost in doubt the existence of an age of stone in Cyprus, on account of the small number of objects hitherto found in the island.[1] Myres also believes that "the stone age is apparently not represented in Cyprus as a distinct period of long duration,"[2] while copper and bronze are found in abundance. I had already written in 1895 that "the origin of the use of metals in the Mediterranean region may be found in Cyprus, the island of copper. From that point its use was diffused through other Mediterranean regions and about the Black Sea, and thence probably by the Danube into Hungary."[3] To-day this fact, that is the fact that Cyprus may have been the center of irradiation of copper and then of bronze through the Mediterranean region and through Europe, seems confirmed by the new discoveries and by the two explorers, Ohnefalsch and Myers, who have determined the contemporaneity, in part at least, of the age of copper in Cyprus and the Neolithic age, delayed in other regions. It seems to be demonstrated that the primitive types of axes and other objects came from that island, and were diffused through the Mediterranean region and through Europe.[4]

Upon the civilisation which I have called Afro-Mediterranean, and which might even better be called Afro-European, an autochthonous civilisation followed the Asiatic influences more or less strong down to the epoch of a new type of civilisation characterised by the arts and by the architecture of the city and the acropolis, the so-called Mycenæan or Ægean civilisation.

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[1] *Op. cit.*, pages 32 and 300.

[2] "Copper and Bronze in Cyprus and in Southeast Europe." *Journal of Anthropological Institute*, Nov., 1897.

[3] *Origine e Diffusione della stirpe Mediterranea*, p. 104–105. Rome, 1895.

[4] Cf. *Op. cit.*, of Ohnefalsch and Myers.

To notice the Oriental characteristics in the Mycenæan art it is sufficient to observe the gold model of a temple found in the fourth sepulcher of Mycenæ, the representation of a siege on a vase of silver, which reminds one of similar if not identical representations in Nineveh and Babylon, the lion hunt represented on a plate of bronze, some steles bearing in relief a car drawn by a horse, many engravings on gems and many other works in both gold and silver.[1]

In view of this, it is astonishing to me to read in Flinders Petrie, one of the best informed of the writers on Oriental Mediterranean antiquity, that "the whole of the early civilisation of the Peloponnesus, commonly now known as the Mycenæan period, is a branch of the civilisation of the bronze age in Europe, with but little contact with the East. Gaul, Hungary, Italy, Greece, and Libya all enjoyed a simultaneous civilisation which brought these countries far more into contact with one another than with the Asiatic lands which played so great a part in the later Greece culture."[2]

Nor have the arguments of Tsountas upon the supposed northern origin of the Mycenæans any value. Two of these arguments, moreover, have been sufficiently answered by Dörpfeld. I need only say that they refer to the forms of the roofs in the Mycenæan houses which Tsountas supposed were gabled, and to the lowness of the houses, which reminds one of the pile dwellings. Both of these forms of construction Tsountas believed to be peculiar to northern countries. Nor is the comparison with the Terramare of the valley of the Po, according to the interpretation of Pigorini, worth anything. It is even more fallacious and erroneous, as I have shown conclusively in another place.[3]

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[1] Cf. Schliemann, *Mykenae*. London, 1888. Tsountas and Manatt, *The Mycenaean Age*, London, 1887. Halbherr and Orsi, *Antichità dell' antro di Zeus Ideo*. Florence, 1888.

[2] "The Egyptian Basis of Greek History." *Journal of Hellenic Studies*. Vol. XI. 1890.

[3] Tsountas and Manatt, *Op. cit.*, pp. XXVI, XXIX, and XXX, 326; Chapters 4, 6, and 14. Sergi, *Arii e Italici*, *cit.*, Chap. 2.

Nor does it seem to me that the opinion of Reinach, expounded so brilliantly in his so-called *Oriental Mirage*,[1] merits discussion. I gave it some attention elsewhere,[2] but now I may pass it by because it has found no followers, nor could it have found them, being contrary to the nature of the facts, the characters of which are very evident.

According to Montelius the Mycenæans were the Tyrrhenians or Pelasgians of Asia Minor, for he writes, "It is evident that the Mycenæan civilisation in Greece is due not only to influences of another country but to the immigration of a new people. That these people, or at least a great majority of the immigrants, came from Asia Minor is proved by the important fact, which, however, has not been sufficiently noticed, that the Mycenæan tombs are of the same kind as those common in Asia Minor. . . . The lions on the famous gate of Mycenæ, and numerous other objects, point also in the direction of Asia Minor, because similar remains have been discovered there, but do not exist in Phœnicia or Egypt."[3] As I have recorded above, Montelius himself admits that the Tyrrhenians coming into Italy, or the Etruscans, were only a part of the Pelasgian emigrants from Greece united with other kindred peoples of Asia Minor.

According to Ohnefalsch, Arcadians, Achæans, Laconians, Pelasgo-Tyrrhenians, and Lycians must all have concurred in the formation of the Mycenæan civilisation.[4] I shall not say that this may not have been true, but I will say that it is only hypothetical. It is quite possible and also natural to suppose that many ethnical elements concurred in the formation and expansion of the Mycenaean civilisation. But it is difficult to determine these elements with precision and give them their national names. However this may be, all these ethnical elements belong to the Mediterranean stock, as portions of it located in different regions and with differ-

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[1] *L'Anthropologie*. Paris, 1893.

[2] *Origione e diffusione delle stirpe mediterranea, cit.*

[3] "The Tyrrhenians in Greece and Italy." *Journal of Anthrop. Institute*. Vol. XXVI. 1897.

[4] *Op. cit.*, 356–365.

ent names. And, according to my conviction they belong to that Pelasgian branch of the Eurafrican species of which I have spoken, because this ethnical branch occupied from prehistoric times the eastern part of the basin comprehending Asia Minor, the Ægean sea and the Greek peninsula, as I have shown in another place.

It is quite possible, then, that the Oriental importers of the Mycenæan civilisation might have been the Pelasgo-Tyrrhenians, as Montelius supposes, united with other kindred peoples who have not received ethnological names. According to what I have already said, the Asiatic Pelasgian or Pelasgo-Tyrrhenian emigrants were not foreign anthropologically to the Mediterranean stock, and hence not even to the primitive inhabitants of the Ægean islands and of the Peloponnesus, who were also Pelasgian. These had already a pre-Mycenæan civilisation in common with the Mediterranean or the Afro-Mediterranean, and they received from new emigrants new elements of the Pelasgian civilisation transformed and evolved under Asiatic influences, probably Mesopotamian.

From this we may observe a very important fact, namely, that this civilisation which is called Mycenæan preserves in the Æegean civilisation many of its Oriental characters, and thus makes plain its immediate derivation. But when it was diffused through the west and north, in the Mediterranean region and in continental Europe, it began to lose many of these characteristics, and acquired others which were peculiar to the populations into which it entered. The Oriental character diminished in proportion to the distance from the center of propagation. When the Mycenæan civilisation was diffused through Italy and Spain its Orientality was still more attenuated, and the same was true when it was diffused through central and northern Europe.

This is quite natural, because every people welcomes germs of civilisation from other regions, but evolves them or imitates their art according to its own disposition and anterior conditions, and gives its own stamp to the imported product. Many forms of artistic motives are preserved in such a transmigration of the civil arts but they have no longer their original character.

Sicily offers a striking example of what I have just said. The

Mycenæan civilisation penetrated it, as Orsi has clearly shown, and a superficial observation of vases, bronzes, and other objects from the first Sicilian period shows the Mycenæan characteristics in many respects. These, however, represent only a part of the whole Sicilian production, which has a local and quite special character, and may not be confounded with the typical Mycenæan, or with any other whatever. There existed in Sicily a local regional production to which was added the Mycenæan importation which was imitated more or less closely. But this is all that may be observed in Sicily. No shadow of the artistic wealth which is admired at Mycenæ, at Tiryns, at Crete, and wherever the Mycenæan culture appeared, exists in Sicily. There seems to be only the twilight of the great Ægean civilisation. This is due to the lack of metals or to some other cause.

Fig. 1.
Tombstone of the Necropolis of Castelluccio (Syracuse, Sicily).

But a fact at first sight surprising is the presence of objects of a Mycenæan character in the first Sicilian period, that is the Eneolithic. I recall the two flat stones which serve as enclosures for tombs. They have spiral ornaments, but are rough and similar to and of the same type as others found at Mycenæ (Fig. 1).[1] There are other objects either imported or imitated. This is surprising because the Mediterranean Eneolithic is much more ancient than

[1] See Schliemann, *Mykenae*, figures 145–159. Orsi, "La necropoli di Castelluccio." *Bull. Paletn. Ital.*, XVII., p. 93 and elsewhere; table 6.

the Mycenæan epoch, and I find no other explanation than that in Sicily the Eneolithic age lasted longer, and until the first Mycenæan influence which arrived a little later.

It is in the second Sicilian period, with its beautiful swords of bronze and the characteristic clasps, that the most decided Mycenæan influence is found. So it seems to me that that period, called by Orsi the second Sicilian period, is really the period in which evidences of the Mycenæan civilisation are most plentiful, although productions with a Sicilian character are not diminished, as is clearly visible in the ceramic products, although, as Orsi shows, even these present different characters in the two periods.[1]

These ideas came into my mind during a recent visit to the Archæological Museum of Syracuse in which I read them as from a book in the disposition of its contents and the wonderful order given by the director, Professor Orsi, and by means of his exposition. I have only to thank him for his courtesy, and for the help which I received from him.

But where the Mycenæan culture had its Occidental expansion was, it seems to me, in Italy and in the Iberian peninsula. While there arose in the southern part of the Italian peninsula a civilisation analogous to the Sicilian,[2] in the central part from Latium to Etruria, and in Umbria to the valley of the Po, especially in the region of Bologna, there is found evidence of a culture which has given rise to various interpretations of its origin.

There, as I have shown elsewhere,[3] may be found three types of culture. In the first place, there is the primitive and very ancient culture, the Neolithic and the Eneolithic, or the Afro-Mediterranean, conscientiously and accurately studied by Colini.[4] Then, there is a second, which may be divided into two periods, the pe-

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[1] "La necropoli di Licodia Eubea," *Bull. dell' imper. Istituto Germanico.* Vol. XIII., p. 347 et seq. Rome, 1898.

[2] See Patroni, *Un Villaggio siculo presso Matera nell' antica Apulia.* Rome, 1898. Monumenti Antichi Publicati dall' Accad, dei Lincei.

[3] *Arii e Italici, cit.*

[4] *Il sepolcreto di Remedello nel Bresciano e il periodo eneolithico in Italia,* Part I., Parma, 1899. Bull. Paletn. Ital.

riod of pure bronze and the first age of iron; and, finally, there is a third which may be regarded as particularly Etruscan.

In the first case the funeral custom was inhumation in natural or artificial caves, or these wanting, the burial of corpses doubled up, as may be observed in Sicily and elsewhere in the Mediterranean region. Here the culture was the indigenous Mediterranean, without any eastern Asiatic influence but with the influence of the culture of the eastern Mediterranean region, since copper could be imported only from Cyprus.

In the second case, which reunites the culture of the metals, bronze, and iron at its first appearance, is found the funeral custom of incineration which I have admitted, and still admit, to be of Aryan origin, since it is found in all the valley of the Po in the epoch of the Terremare, in the age of bronze and in the well-tombs of Villanova, of Certosa, of Bologna, of Etruria, and in parts of Latium. But the culture of either bronze purely, or of bronze with the first indications of iron, like that which is found at Villanova and at Vetulonia, was already an Oriental Mediterranean importation with the influences of the Asiatic culture which had become Mycenæan.

The third form of culture, or the Etruscan, was substantially the same as the second. But while the second was more ancient and had already undergone a transformation, as I have just pointed out, losing in part its Asiatic color so clearly preserved in the Mycenæan civilisation of the Ægean, the third, which is a direct Etruscan or Tyrrhenian importation, preserves more than the other its Orientality, although less of the original Mycenæan or Asiatic influence. The explanation of this may be found in the fact that while in Adriatic Umbria we know of Pelasgian colonies only by tradition, and hence their culture must have been imported as a commercial product which was imitated in Etruria, there was certainly an Oriental colony which preserved many of the characteristics of the original culture. And while in the civilisation anterior to the Etruscan period the funeral practice of incineration was the dominant one, because the material power was Aryan, while the culture was Mycenæan in origin, in the Etruscan period the Aryan

dominion was overthrown and the Etruscan substituted over a great part of Italy both to the south and to the north of Etruria. Hence there is found the restitution of the ancient custom of inhumation, a custom peculiar to the Mediterranean stock.

Certainly one of the difficulties of the archæologists in recognising the Oriental origin of the Etruscan and Villanovan civilisations is in the loss or diminution of its Oriental characters in its passage to the Occident, where new centers of regional culture were formed. These naturally began with the imitation of the culture imported.

This phenomenon may be observed elsewhere, that is in central and northern Europe, as I will show further on, where the distance is greater because the importation was indirect and came from southern regions.

But the marks are so evident that Pigorini himself, who persisted in finding in the Terremare an Italico-Aryan people and a culture from the north, has had to recognise the relations between these old stations and the Ægean sea, although he considers these relations to have been late and a phenomenon of the superposition of the Mycenæan culture upon the more ancient culture of the Terremare, which had another origin.[1] This is contrary to Orsi and Petersen, who admit that there were more intimate relations between the Ægean culture and the Italian culture of the Terremare and of Villanova.[2]

It has been difficult to recognise this fact in the culture of the first age of iron in Italy, and still more difficult to recognise the analogy, and in some cases even the identity, of the bronze products found in Terremare with the Mycenæan. It is so difficult that even to-day it is in part or altogether denied. But after a careful examination, especially in the works of Montelius, of the articles found, and after a comparison, presented also by Orsi, I believe that it should no longer be doubted.

Probably, as I have said elsewhere, the introduction into upper

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[1] *Bull. Paletn. Italiana*, Vol. XX., p. 173; XXIII., p. 86.

[2] Petersen, *Bull., cit.*, XXIII., p. 81 et seq. Orsi, *passim*.

Italy of this culture took place by three routes, the sea, the Danube, and over the Alps. And this explains the later expansion of the culture of Hallstadt to Watsch, Bosnia and Herzegovina and into that extended zone which I have elsewhere described.[1] For the variations which are found it is necessary to find another cause, namely, the regional conditions in which the products were imitated, and hence varied with the greater liberty of the artist.

If we transport ourselves to the Iberian peninsula, we find the now celebrated discoveries at the southeast of Spain, which have revealed a rich and wonderful culture. There also may be found the Mycenæan culture along with the regional productions.[2] From this fact we derive the idea that the Oriental importation was like a movement which aroused a latent activity, and hence on account of the favorable geological conditions of the peninsula rich in metals, artistic production was easily raised to a higher level than that of Sicily, which was poor in metals. Nor is it out of place to suppose with Orsi that many Iberian products may have come into the island, and that there may have been besides the direct Mycenæan influence, an Iberian influence which was the Mycenæan on its way back, but made over and reformed.[3]

But after the strange suppositions of Reinach, there is felt the need of a master hand like that of Montelius to delineate the movement of the southern Oriental culture toward the west and the north of Europe. By the examination of the articles of copper and bronze, and in part also of those of ceramic, Montelius came to the conclusion that the use of these two metals, one in the pure state, the other as an alloy with tin, came into central and northern Europe from the Mediterranean region. Here are his words: "In the countries which lie at the south of the northern region, as also in western Europe, there are found much copper and tin. In these two districts the influence of the Oriental culture was more ancient than in the north, and on account of this influence they learned the

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[1] *The Monist*, Jan. 1898, "The Aryans and the Ancient Italians."

[2] Siret, *Les premiers âges du metal dans le sud-est de l'Espagne.* Anvers, 1887.

[3] *Bull. Paletn. Italiana*, XXIV., 1898, p. 200.

use of metal, which use was discovered in the Orient. The northern region during the age of stone had some relations with the Orient by means of the people to the south and west.

By two routes, then, the elements of Oriental culture came to the north. One of these which I have called the Occidental, follows the northern coast of Africa to Spain, thence along France and the British Islands until it arrives at the coast of the North Sea in Germany and Scandinavia. The other, which I have called the southern, penetrating the Balkan peninsula or passing by the coast of the Adriatic Sea, then through the valley of the Danube and continuing along the German rivers, especially the Rhine and the Elbe, finally reaches the coasts of the North and the Oriental Sea.[1]

After a series of comparisons and proofs drawn from the articles found, Montelius concludes thus: "All this proves that very soon an influence from the Oriental Mediterranean region, including Cyprus, was exercised, whence the peoples of the Balkan and the valley of the Danube, derived a knowledge of the metals." And he insists even in admitting it, as he had already admitted many years before, that bronze may have come to the north from the Mediterranean culture but not from the Phœnician, nor could it have been imported by the Celts or the Germans.[2] I believe, then, that Italy must have been the center of diffusion of bronze products, but at the same time there may have been many local forms as regional products, of which, however, the type may have been derived from Italy.[3]

From all this that Montelius presents us, and which fits in perfectly with my conclusions expressed on various occasions concerning the origin of the Mediterranean civilisation and its diffusion, it results that there was a movement of culture which appears to have been carried from one place to another like a torch; in some places,

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[1] "Die Chronologie der ältesten Bronzenzeit in Norddeutschland und Skandinavien." *Archiv für Anthropologie.* XXVI., 1899, p. 456.

[2] *Op. cit.*, pp. 480, 489.

[3] *Op. cit.*, pp. 506, 509.

however, it seems like the movement of a wave proceeding from a center, enlarging its circumference but diminishing its height until it finally expends itself, leaving indications of its movements. So the Mediterranean culture appears after the primitive Afro-Mediterranean, which also in certain parts had more or less definite centers of diffusion. But the culture which we may call the culture of the metals, especially of bronze, was born in the Orient, moved toward the Occidental Mediterranean regions, and pushed along toward continental Europe by various currents at the south and at the north until it reached the British Islands on the one side, Germany and Scandinavia on the other, and finally central Russia.

But if the forms of the Mediterranean culture gradually disappeared along the routes of diffusion, there happened another very important phenomenon. New centers of production were formed, especially where the conditions were favorable, and hence regional products which were in whole or in part unlike the original models, even in technique. This phenomenon has caused us sometimes to lose trace of the origins of European culture.

Now there arises finally the question: Has the bronze culture any relation with the people called Aryan? Is it one of their importations? In spite of the fact that for some time I have attempted against prevailing opinion to show that the Aryan invaders of Europe were barbarian and savage, and had a culture inferior to the Neolithic,[1] I have admitted that they were the importers of bronze. This idea appeared to me to be true because bronze appears principally in Europe as contemporaneous with the Aryan invasion. Not being an archæologist I had not been able to examine the forms of the articles as has since been done by more competent men, and seeing that the distribution of bronze in Europe corresponded with the distribution of the Aryan culture, especially of tombs for incineration, I was induced to think that the one fact was united with the other as a manifestation of the same stock.

But the new analyses and the new facts in regard to Mediterranean diffusion set forth in the works of Ohnefalsch-Richter, of

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[1] *The Monist*, *cit.*, "The Aryans and Ancient Italians."

Myres, of Montelius, and others; the characters of the Mycenæan culture, which is the culture of the bronze age, now better known than before, coming from the Asiatic Orient, and the diffusion of this Mycenæan culture in Europe by the movement above described, together with the formation of new centers of production caused by the propagation of the Oriental Mediterranean culture, have led me naturally to the conclusion that the Aryans were not the importers of bronze into Europe, as was believed, and as is believed even now.

A coincidence which reconciles the common diffusion of the metallic arts already noted in the eastern part of Asia Minor and the Mediterranean region, led us to suppose a causal connexion between them, as did also the thought that the origin of the two great and later Mediterranean civilisations, the Greek and the Latin, were due to the Aryan. Certainly the Aryans availed themselves of the metals which came to them from the civilisation which they were afterwards to submerge with their invasion of barbarism. But they did not contribute in developing the technique, unable as they were to practice new arts. This technique came to them always from the Mediterranean regions.

I know how much opposition this conclusion will meet with from those who are crystallised in the old ideas, born of the impressions made by primitive researches. But I am not dismayed. The future will better illuminate the darkened truth.

To complete the argument in favor of the thesis that the culture of the Eurafricans in Africa and in Europe was prior to any Asiatic invasion whatever, like that already signalised and which marked a new era in Europe, it remains for me to say something of the linear alphabetiform script.

For a long time the alphabetiform characters of Libya and of the Canaries have been known principally through the works of Faidherbe, but there has not been given to them an interpretation like that which now presents itself after the recent discoveries of prehistoric Egypt and those anterior to the Neolithic age of Europe. Letourneau in 1893 first communicated to the Anthropological Society of Paris some observations upon the alphabetiform

characters of the Megalithic inscriptions, and showed how many of these characters bore a likeness to physical characters. He pointed out the anteriority of the Megalithic characters to the Phœnician, and indicated that the constructors of the so-called Megalithic monuments had come from the south, and had learned from the races of north Africa[1] (Fig. 2).

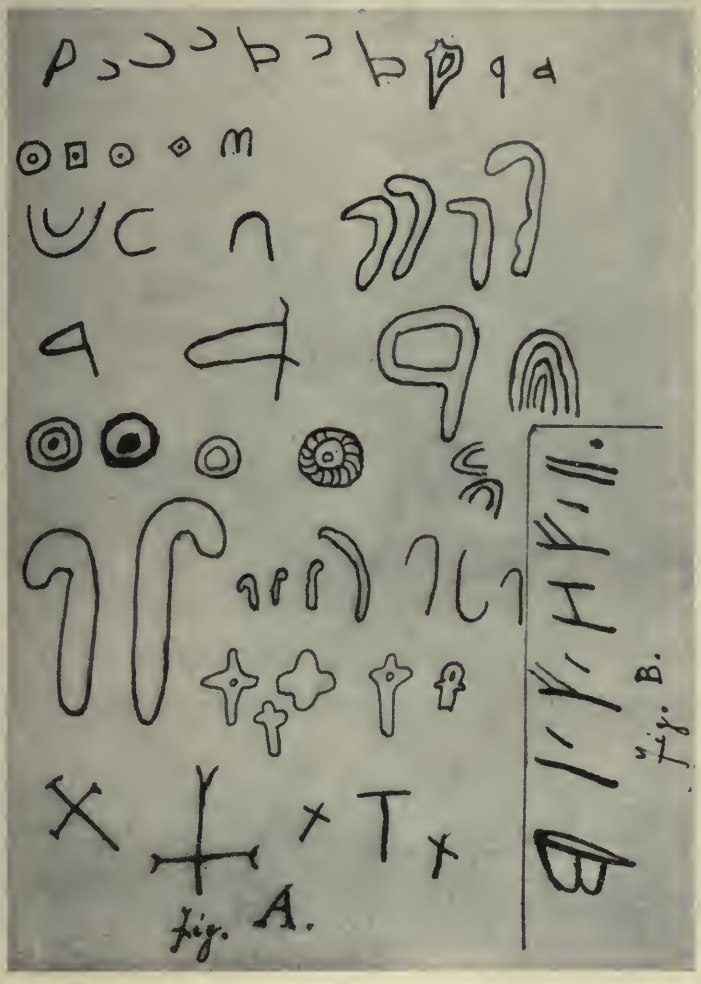

Fig. 2.
Alphabetiform Characters of the Dolmens.

But a more curious discovery was made by Piette in the most ancient epoch of the period of the dolmens and anterior to the Neolithic, that is, toward the end of the Madelene epoch, in a period of transition between Paleolithic and Neolithic Europe. He

[1] *Bulletins Société Anthropologique de Paris*, 1893.

discovered at Mas-d'-Azil in the southeast of France, in a cave, many flints colored with the peroxide of iron and with alphabetiform characters (Fig. 3), some of them similar to those already found carved in the dolmens. Piette shows that the new graphic characters of Mas-d'-Azil are identical with the Cyprian alphabet,

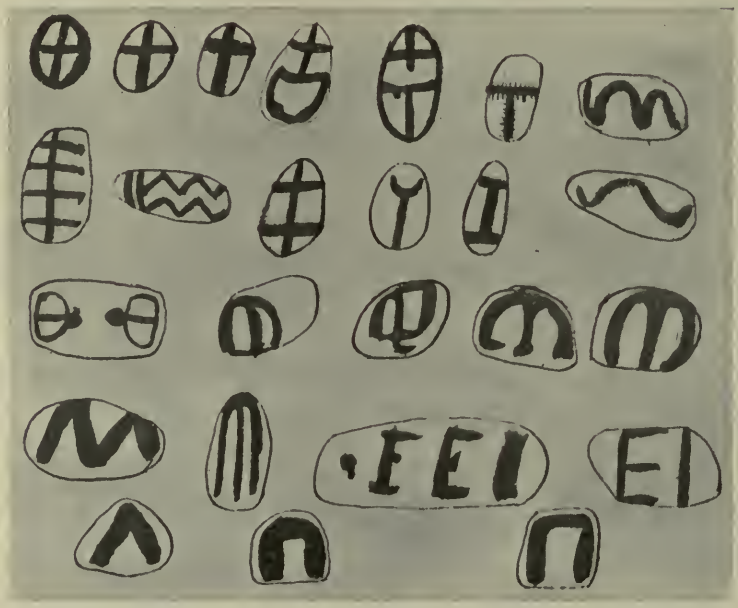

Fig. 3.
Characters on the Colored Flints of Mas-d'-Azil.

and that eight Asilian characters, of which some are Cyprian, form a part of the Ægean alphabet. Even many of the ancient inscrip-

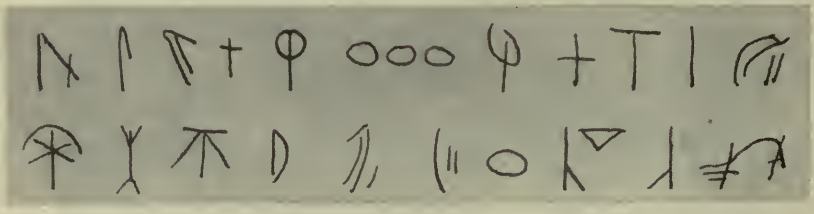

Fig. 4.
Alphabetiform Characters on Terra-cotta Vases of Prehistoric Egypt (De Morgan).

tions of Asia Minor, especially of the Troad, present characters like the pictures of Mas-d'-Azil.[1]

The discoveries of Flinders Petrie, of De Morgan and others have revealed a prehistoric script in Egypt, not the hieroglyphics,

[1] *Études d'Éthnologie pré-historique. Les Galets coloriés du Mas-d'-Azil. L'Anthropologie*, VII., 1896.

and peculiar to the Pharaonic civilisation. This script in the characters which compose it is of the same type as that already found on the engraved stones in the dolmens and on the colored flints of Mas-d'-Azil (Fig. 4).

In an interesting study Arthur Evans had demonstrated the existence of a script in the Mediterranean region, first at Crete and then in other localities of the Ægean region, anterior to the so-called Phœnician script, or that known as Phœnician. In another more recent work the ingenious author has shown a convergence of the Cretan and the Ægean script with the prehistoric Egyptian or Proto - Egyptian or Egypto-Libyan, as he calls it.[1] But Evans does not stop here in his comparison. Convinced that the prehistoric Egyptians were Libyan, and therefore of the same stock which populated Africa and the west of Egypt, he shows convergence of the Ægean script and the Proto-Egyptian with that of the ancient Libyan inscriptions which contain the well-known Libyan alphabet (Fig. 5). There is an analogous re-

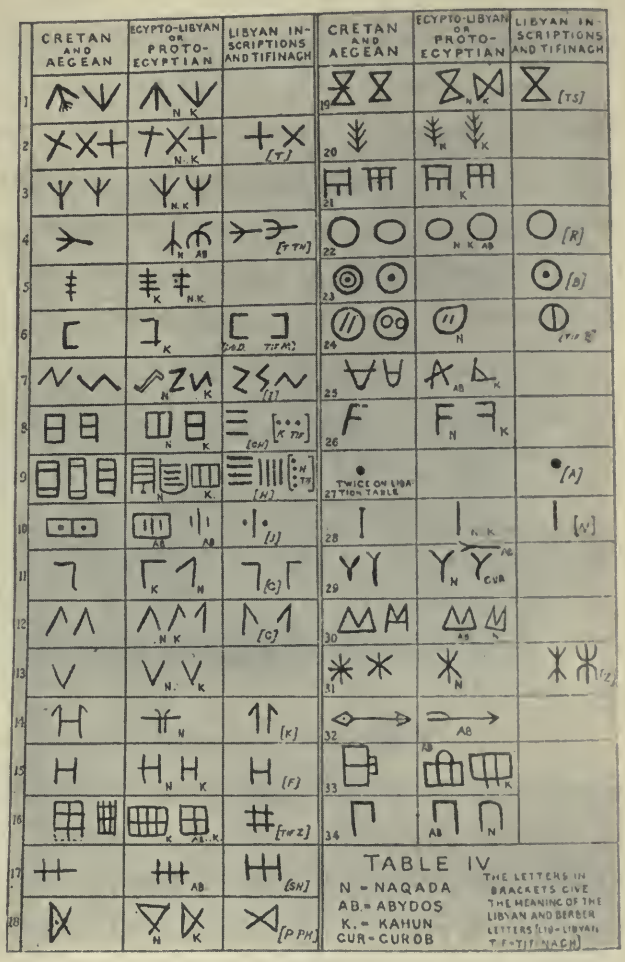
CRETAN AND AEGEAN
EGYPTO-LIBYAN OR PROTO-EGYPTIAN
LIBYAN INSCRIPTIONS AND TIFINAGH
CRETAN AND AEGEAN
EGYPTO-LIBYAN OR PROTO-EGYPTIAN
LIBYAN INSCRIPTIONS AND TIFINAGH
TABLE IV
N = NAQADA
AB = ABYDOS
K. = KAHUN
CUR = CUROB
THE LETTERS IN BRACKETS GIVE THE MEANING OF THE LIBYAN AND BERBER LETTERS (LIBO-LIBYAN T.F.-TIFINAGH)

Fig. 5.
Comparative Table of Pre-Phœnician Characters. (Evans.)

[1] "Primitive Pictographs and a Pre-Phœnician Script from Crete." *Journal of Hellenic Studies*, 1896, Vol. XIV. Further discoveries of Cretan and Ægean script with Libyan and Proto-Egyptian comparisons, the *Journal*, *cit.*, 1897, VI. and VII.

sult as to the alphabet of the Canaries which is also held to be Libyan.

But we may extend Evans's comparison further, which is limited to the Mediterranean region and to Africa, and apply it to the characters of Mas-d'-Azil and of the European dolmens. We find, in fact, characters perfectly identical to them in the ivory tablets of Egypt (Fig. 6) and also in the Megalithic inscriptions (Fig. 2) and on some of the flints of Mas-d'-Azil (Fig. 3).

Hence the use of characters for writing is very ancient in the Eurafrican species, so ancient in fact that they have already definite forms in the Magdalenian epoch, an epoch anterior to the Neolithic age. And the diffusion of these alphabetiform characters into the regions where the species itself was disseminated, and therefore into Africa or the Canaries, the Mediterranean regions of

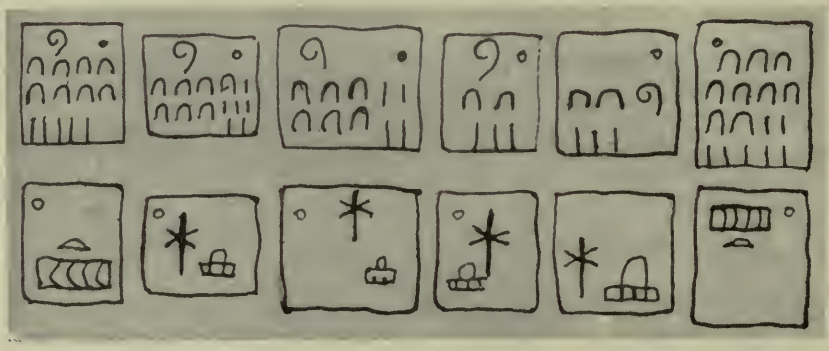

Fig. 6.
Characters Engraved on Ivory Tablets of Prehistoric Egypt.

western and northern Europe, and wherever the dolmens are found, is also very ancient. This fact shows, what I have heretofore attempted to maintain on various occasions, that this human species had its highest development of civilisation in the basin of the Mediterranean, and in its various divisions which assume different ethnical names in proto-historic and historic times. And it is found at a higher level of civilisation at the time of the invasion of the Asiatic immigrations, which submerged the civilisation and reduced the primitive inhabitants to barbarism until new germs of civilisation were born in the Mediterranean region and developed into the two great forms of Greek and Latin culture.

Rome, Italy. G. Sergi.

KANT'S PHILOSOPHY CRITICALLY EXAMINED.

KANT'S philosophy has become the beginning of a new epoch in the evolution of human thought through a formulation of its basic problem and by starting out in the right direction for its solution; but Kant has not spoken the final word.

Kant was awakened from his dogmatic slumber by Hume's scepticism, and it was Hume's problem as to the nature of causation which prompted him to strike a new path in the conception of philosophical problems.

Kant threw light on Hume's problem by generalising it and recognising the kinship of the conception of causation to mathematics and logic, all of them being purely formal knowledge. The significance of formal thought and its power of affording *a priori* cognitions is Kant's peculiar problem.

It is generally conceded that Kant solved Hume's problem, but he failed to solve his own.

By a strange misapprehension of the nature of form and its non-objectivity, he has switched off into an idealism (so called by himself) which it will be hard to distinguish from that subjectivism which he assumed Berkeley's philosophy to be. The difference between the two (in Kant's opinion) consists in this, that according to Kant, the world itself is real but in the form in which it represents itself in space and time it is phenomenal, while he declares that according to Berkeley the world itself is "illusory appearance." Further Kant insists that the world as appearance, though purely phenomenal, is not an arbitrary illusion, but governed by laws which render it necessary in all its details.

The great merit of Kant is his wonderfully keen discrimination between the purely formal and the sensory, showing that the former is throughout universal and necessary in its principles, while the latter is incidental and concrete or particular; but he fails to apply the same discrimination to his conception of experience and to the objects of experience, and thus he limits the formal to the subject, while it is obviously the universal feature of all existence, objective as well as subjective, constituting between them the connecting link that makes science, i. e., objective cognition, possible.

Before we examine Kant's position, we must first discuss, at least briefly, Hume's problem and offer the solution in the form which Kant, in our opinion, ought to have given it. It will then be easy to point out the error that led him astray and prevented him from offering a definite and final doctrine as to the nature of form which should become the basis of all scientific inquiry, and enable philosophy to become a science as definite, or nearly so, as are mathematics and logic, or even physics.

HUME'S PROBLEM.

Locke objected to the doctrine of innate ideas, claiming that all ideas were the products of sense-impressions, and he excepted only one idea, viz., the principle of necessary connexion, i. e., causality. Hume accepted Locke's sensualism, but, endeavoring to be more consistent, drew its last consequence by denying even the idea of cause and effect as a necessary connexion. He argued that we meet with constant conjunctions in experience, but not with necessity. By habit we are compelled to expect that upon every cause its due effect will follow, but there is no reason to assume that causation is due to a universal and necessary law of objective validity. Hume saw in the relation between cause and effect a synthesis, calling it "the sequence of two objects"; and if it were a synthesis, or a mere sequence, he would be right that the connexion between cause and effect is accidental and our belief in its necessity a mere habit.

The truth is that causation is not a sequence of two objects following one another, but one process, a motion, or a change of

place; and the simplest kind of motion implies that there are at least three phases or states of things in the system in which the motion takes place: first the original condition (which for simplicity's sake we may assume to be in a relative equilibrium); secondly, the motion disturbing the equilibrium so as to make one or several elements in the system seek new places; and thirdly, the new adjustment (which for simplicity's sake we will again regard as being in equilibrium). The first phase is called the conditions or circumstances, the second is the cause, and the third the effect. Cause and effect are not combined into a unity by the compulsion of a law of necessary connexion; they are two phases of one and the same process. The duality is a product of abstraction; the unity of the two is the original fact, and we know now that causality is but another expression for the law of the conservation of matter and energy. The naturalist assumes that matter and energy are indestructible, and thus every process that takes place in nature is only a transformation. Accordingly, our belief in causation is after all, although Hume denied it, finally based upon the logical principle of identity $A = A$. It is an extension of this principle to a state of motion.

Cause, accordingly, is never an object, but always an event, viz., a motion of some kind. We cannot call the bullet the cause, and death the effect; or mercury the cause, and paralysis the effect; or worse still (as says George Lewes) that whiskey, water, sugar and lemon are the causes of punch.

We distinguish between cause and reason, reason being the law under which a single event is subsumed for the sake of explaining the effectiveness of the cause.[1]

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[1] The instinct of language has here proved wiser than the scholarship of philosophers. All European languages (the Greek, the Latin, together with its derivatives the French, Italian, etc., the German, the English) distinguish between "*αἰτία, causa, Ursache* (from the same root as the English verb 'to seek') cause," and "*ἀρχή*, (i. e.. first principle) *ratio, Grund*, reason," the former being the particular incident that starts a process, the latter the *raison d'être*, the principle, or general rule, the natural law that explains it. When the two ideas are confounded, as has been done frequently by philosophers, the greatest confusion results, leading to such self-contradictory notions as "*causa sui*," "first cause," "ultimate cause," etc., which lead either to agnosticism or to mysticism. For further details

Kant, following the suggestion of Hume, devoted special attention to the problem of causality, but he solved it by simply declaring that it was a concept *a priori*, and thus belonged to the same class of truths as mathematical, arithmetical, and logical theorems. He never attempted to explain its truth, let alone to prove it, or to demonstrate its universality and necessity. Mathematicians deem it necessary to prove their theorems, but Kant, strange to say, neglected to deduce the law of causation from simpler truths or analyse it into its elements. If Kant had made attempts to analyse causation for the sake of proving its validity after the fashion of logicians and mathematicians, he might, with his keen insight into the nature of physical laws and natural sciences, have anticipated the discovery of the law of the conservation of matter and energy, and might furthermore have been preserved from the error of his subjectivism, which affected the whole system of his thought and twisted his philosophy out of shape.

KANT'S PROLEGOMENA.

In the *Critique of Pure Reason* Kant's position remains unintelligible; we understand his arguments and may even approve the several statements from which they proceed, but we are astonished at the boldness of the conclusion, and fail to be convinced. His objections to the belief in space and time as objective things hold good only if space and time are assumed to be things or objects; but not if they are thought to be mere forms of objects. They are thinkable as forms of thought not less than as forms of objects. When assumed to be solely forms of thought to the exclusion of the idea that there are any objective relations corresponding to them, they become mysterious and quite mystical, and here lies the reason why Kant's *Critique of Pure Reason* is actually mystifying. He bewilders the reader. We become acquainted with his argument, but do not feel sure that we have rightly apprehended his meaning. In the *Prolegomena* Kant is, at least, not unintelli-

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see the author's *Primer of Philosophy*, the chapter on Causation, pp. 30–34, and *Fundamental Problems*, pp. 29–30.

gible. The *Prolegomena* are not deductive, but inductive. In them Kant leads us the way he travelled himself, and this is the reason of the importance of the *Prolegomena*. Kant embodied their contents in various places into the second edition of his *Critique of Pure Reason*. But the passages are scattered and lose the plainness and power which they possess in the context of the *Prolegomena*. Here we are face to face with Kant as a man; he gives us a personal reply, as if he were interviewed; and while we grant the significance of transcendentalism and the truth of many of his observations and deductions, we can at the same time understand how he arrived at errors. We can lay our finger on the very spot where he went astray, and I cannot but wonder at the courage of this undaunted thinker who abided by the consequences of an apparently trivial fallacy, due to the neglect to investigate one feature of the problem to which he devoted many years of his life in profound reflexion and close study.

Kant was puzzled that we could know anything *a priori* concerning the formal constitution of things. The celestial bodies obey laws which man develops out of his mind. That the highest (i. e., the most general or universal) laws of nature should happen to be the same as the highest (i. e., the formal) laws of the thinking mind, and yet should be of an independent origin, seemed absurd to Kant. He saw only two possibilities; either, he said, we have derived our formal knowledge from the things by experience, or we ourselves have put it into the things to which it really does not belong. The former possibility is excluded, because, says Kant (*Prolegomena*, § 9), "The properties of a thing cannot migrate into my faculty of representation," while on the other hand the purely formal truths are not derived from experience, but produced by the mind as cognitions *a priori*. Thus, Kant accepts the other horn of the dilemma, declaring (*Prolegomena*, § 36) that our faculty of cognition does not conform to the objects, but contrariwise, that the objects conform to cognition. Objects, he claimed, do not in themselves possess form, but our mind is so constituted that it cannot help attributing form and everything formal to the object of our experience.

IDEALITY NOT SUBJECTIVITY.

Now, it is true that our purely formal notions of mathematical and logical truths are ideal (made of the stuff that ideas consist of), but being purely formal they are definitely determined, that is to say that, wherever the same constructions are made, either by the operations of other minds or of natural conditions in the facts of objective reality, they will be found to be the same. Thus, our mental constructions can reconstruct the processes and formations of nature, and we can learn to predetermine the course of natural events.

Kant did not see that form might be a property of all existence and that, in that case, the purely formal in things would be of the same nature as the purely formal in man's mind. It is true that the properties of things do not migrate from the objects into the subject, but they make impressions upon the senses and these several impressions possess analogies to the qualities by which they are caused. The analogies between matter and sensation seem much more arbitrary than those between the shapes of things and the outlines of our sense-images. Nevertheless even here we grant that the reduction of the latter to universal laws is purely subjective, for there are no laws, *qua* formulated laws, in the objective world; there are only uniformities. But if we understand by the term law a description of uniformities we must see at once that there are objective realities (or rather features of reality) corresponding to our correct notions of the several formal laws.

If the uniformities of nature are not transferred to the mind directly, but if the purely formal concepts are developed independently of sense-experience *a priori*, how is it possible that the two present the wonderful agreement that puzzled Kant?

Nature is throughout activity, and so is our existence. Nature is constantly combining and separating; we observe transformations; things move about; and their constituent parts change places. Similar operations are inalienable functions of the mind. The subtlest analysis as well as the most complicated composition and

every investigation, be it ever so intricate, are mere combinations and separations, activities given together with our existence.

The arguments of Kant by which he proves the apriority of purely formal laws must be granted to be true. The source of all purely formal thought is the mind, and not sense-perceptions. They are ideal. But the mind has been built up by experience, viz., by sense-impressions of different but definite forms, and the formal order of objective nature is the mould in which the mind has been formed. The brute cannot as yet analyse sensations into their forms and materials, i. e., into the purely relational and the purely sensory features; but man can; and when he has acquired the power of abstraction he can build models of forms, exhausting the entire scope of all possible cases, and these models serve him as examples of the several analogous formations of nature. Accordingly, our mental constitution, though a subjective construction, is built up with materials quarried from the formal uniformities of objective nature. Thus the spider undoubtedly weaves his web from his own bodily self, but the materials have first been deposited there by nature. Man's mind is not less than the spider's silken thread, produced by, and remaining a part and an expression of, that great All-Being in which all creatures live and move and have their being.

There is this difference between the spider's web and formal thought: the former consists of matter, the pure forms of mathematical, logical, and other ideas are immaterial; they are abstracts made of the purely relational features of sense-impressions. They are ideal, viz., mental pictures, and as such they are subjective. But they are not purely subjective. The sensory part of a retinal image is purely subjective, but the formal preserves in a reduced size the projection of the shape of the object. Form belongs to the object as well as to its subjective image, and thus the subjective conception of form possesses an objective value.

Everything ideal is subjective, but it need not be purely subjective. Because the rational is ideal, it by no means follows that it is not, and cannot be, objective.

When we construct some purely formal configuration with our

nature-given mental operations, it will be the same as any other construction which has been made in the same way, be it in the domain either of things or of other minds. Nature performs the same operations which appear in man's mental activity. Man being a part of existence, what is more natural than that his bodily and mental constitution partakes of the same form as all the other parts of the world that surrounds him?

A great and important part of our knowledge consists of purely formal theorems; they are *a priori*. And these purely formal theorems contain actual information concerning the formal aspect of the real world. And why? Because they are systematic reconstructions of the formal features of reality by imitating operations of motion which take place throughout the universe.

All formal theorems have a general application, hence, whenever applicable, they afford *a priori* information and can be employed as a key to unlock the mysteries of the unknown.

By the rule of three we calculate the distance from the earth to the sun, and map out the paths of the several celestial bodies.

When Kant says: Our mind "dictates" certain laws to the objects of experience, he uses a wrong expression or takes a poetical license seriously. The mind "dictates" nothing to reality. Reality including its form is such as it is independently of what we think it to be. That which Kant calls dictating is a mere determining, a description, implying at the same time a foretelling or predicting of natural events which (as we saw) is done by constructing in our mind analogous models. The agreement between our model and reality proves only that the scheme on which the model has been constructed is correct; it does not prove that the model does any dictating. The model dictates as little to reality as a barometer dictates what air-pressure there is to be in the atmosphere.

THE FORMAL AND THE SENSORY.

While we must object to Kant's doctrine that everything ideal is subjective and that what is directly derived from the mind cannot be objective, we must not (with the Sensualists) place the formal and the sensual on the same level. Kant is right that space

and time are not objects or things or entities; they are forms, and as forms they possess the quality of being empty. There is no particularity about them anywhere. Thus, space is space anywhere; it is not like matter, denser here and looser there; nor like energy, here intense, there weak. Considered in itself, space is the mere potentiality of existence. It is a description of the condition of granting motion to move in all directions. Its very indifference and absence of anything particular implies uniformity; and thus the laws of potentiality (i. e., the qualities of possible forms) are mere schedules; they are empty in themselves, but possess universal application.[1]

The formal aspect of reality is its suchness; the material element is its thisness. All suchness can be formulated in general, and even in universal, descriptions; all thisness is individual and particular. Statements of a general nature, such as are formulated by employing the methods of formal thought, are not single and concrete facts, but omnipresent and eternal laws; they are true or untrue, correct or incorrect. Facts of thisness are always in a special time and in a special spot in space. They are definite *nunc* and *hic*, not a *semper* and *ubique*. They are not true or untrue, but real or unreal.

The essential feature of things is their form; for their form, which is their suchness, viz., their external shape as well as internal structure, constitutes their character, their soul, their spiritual significance, making them what they are. Their thisness is their concrete presence which actualises the thing as a stubborn fact of the material universe.

It is true that the sense-pictures in which the world is represented to us are subjective; they are appearances or phenomena; it is further true that these pictures are radically different from the things which they represent. The color-sensation red has no similarity (as Kant rightly observes) to the physical qualities of ver-

[1] These truths have been felt by philosophers of all nations, and it is surprising to find them in the writings of Lao-Tze and the Buddhist scriptures, in both of which the absence of materiality, the not-being, plays an important part and is endowed with religious sanctity.

million; and physicists have sufficiently penetrated into the constitution of matter of any kind (though most of the problems remain still unsolved) to convince us that matter as it is in itself is radically different from the subjective picture as which it presents itself to the senses. But the scientist assumes form to be objective, and all the theories as to the constitution of matter, in chemistry as well as in the several branches of physics, are based on the principle of eliminating the subjective element, that is to say, the properly sensory ingredients of our experience, by reducing them to statements in purely formal terms, which is done by measuring, by counting, by weighing, by defining their proportions, by describing their shape and structure, by determining their relations; and if we have succeeded in doing so, we claim to have understood the objective nature of things. How can Kant's statement be upheld, that the sensation red is not an objective quality of vermillion? Is it not because physics has taught us that difference of color depends upon a difference of wave-length in ether vibration? Kant's argument is based upon a tacit but indispensable recognition of the objectivity of form and formal qualities.

Therefore, while granting that the sense-begotten world-picture of our intuition is subjective appearance we claim in contrast to Kant that its formal elements represent a feature that inheres in existence as the form of existence.

In making form purely subjective, Kant changes—notwithstanding his protestations—all ideas, all thoughts, all science, into purely subjective conceits. He is more of an idealist than Berkeley. Science can be regarded as an objective method of cognition only if the laws of form are objective features of reality.

THE MORAL ASPECT.

An incidental remark on the moral aspect of the contrast between the purely formal and the sensory would not seem out of place here. Man has risen from the sensual plane into the abstract realms of reason, and morality becomes possible only by man's ability to make general principles the basis of his actions. Thus it happens that at a certain period of man's development the sensory

is regarded as the lower, and generalisations with what they imply, ideals, maxims, abstract thought, as the higher. The sensory is thus discriminated against and even denounced as the enemy of the spiritual. Hence the dualistic phase in the religious and philosophical evolution of mankind in which sensuality is branded as sin and salvation sought in asceticism, i. e., the mortification of the body.

We must consider, however, that the contrast between form and matter, general law and particular existence, the ideal and sensory, spirit and matter, does not imply a contradictory antithesis, let alone any hostility or exclusivity of the two. That the spiritual, viz., the conception of the purely formal with reason and its generalisations, develops only on a higher plane, cannot be used to incriminate the sensory and the bodily. On the contrary, the spiritual justifies the sensory and points out the higher aims which it can attain.

And how indispensable is the sensory in religion! Consider but love, so much insisted on by the preachers of almost all higher faiths. Is it not even in its present form a sentiment, i. e., a sensory emotion? The truth is that morality consists in the sanctification of the sensory, not in its eradication; and sanctification means setting aside and devoting to a special purpose, to the exclusion of a general use. Particularity is the nature of bodily existence and particularity demands exclusiveness. Any general use of bodily functions will prostitute them. Reason, on the contrary, is meant for general use and can never suffer from a general application.

Kant's conception of morality is based upon reason, to the exclusion of sentiment. Reason makes action according to principles or maxims possible, and all those maxims are moral which can become universally established. Thus the basis of ethics is the golden rule, pronounced by Confucius, Christ, and other religious leaders of mankind. Lao-Tze says of the sage: "His methods invite requital."[1]

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[1] *Tao-Teh-King*, Chapter 30.

FORM BOTH SUBJECTIVE AND OBJECTIVE.

We believe we have satisfactorily explained the problem of the *a priori*, of the purely formal, which puzzled Kant; we have further shown how and why the laws of purely formal thought agree with the highest laws of nature; why being devoid of particularity they are universal (implying necessity); and there remains only to be pointed out that the validity of science rests upon the assurance of the identity of the subjective and the objective laws of form. Form, being common to both domains, the objectivity of things and the subjectivity of the mind, serves as a bridge on which cognition can advance into the unknown realms of objective existence, and thus the formal sciences constitute our organ of cognition, the objective reliability of which depends upon form's being an objective feature of things.

It goes without saying that all that Kant says concerning their infinity, uniqueness, universality, and necessity as being against the belief that space and time are objects or things holds good; it proves that they are forms. Yet though they must not be regarded as objects, they are objective; they are the forms of intuition but also of the objects intuited. Further, what Kant says (relying on symmetry as intuitively perceived) to prove that they are forms of intuitions and not concepts, holds as well to prove that they are sighted forms of existence, not internally hidden qualities of a stuffy, thingish nature to be distilled from sense-perception in the alembic of the observation before its existence can be known. It is true that the world as it appears to us is a sense-woven, subjective picture; things as we perceive them are phenomena. Further, our concepts, including the world-conception of science, which is built up with the help of the purely formal laws of thought, is a mental construction; they are noumena. Both worlds, that of sense and that of thought, are subjective; but they represent reality; the senses picture the world in the beauteous glow of sensations, and the mind describes it in the exact measures of formal determinations; but the latter, if true, offers an objectively valid model of the

constitution of things, explaining their suchness without, however, giving any information as to the nature of reality in itself, i. e., what matter is in itself; whether it is eternal or not; why it exists; and if it came into being, or how it happened to originate. It is obvious that things are not matter, but matter of a definite form; the form is cognisable, while matter is simply the indication of their concrete reality as objects in the objective world.

SUBJECTIVE CONSTRUCTIONS OF OBJECTIVE VALIDITY.

Kant in discriminating between empirical perception (viz., the sense-impressions possessing only subjective validity) and experience (viz., the product of sense-impressions worked out by the *a priori* methods of pure reason imparting to our judgments universality and necessity)[1] goes far in refuting himself and his pet theory. He speaks of universality and necessity as the only means by which the subjective elements can become objectively valid. He claims, e. g., to "have amply shown that they (the concepts of the pure understanding, causality, including also mathematics, etc.) and the theorems derived from them are firmly established *a priori*, or before all experience, and *have their undoubted objective value*, though only with regard to experience."

If the concepts of the pure understanding have objective value, why are they not objective? Why must they be regarded as purely subjective? We grant the strength of Kant's argument that, being unequivocally creations of the mind independent of sense-experience, or, as Kant calls them, *a priori*, they are subjective. But is not the question legitimate that they may be at once subjective and objective? Kant disposes of this question too quickly, and here lies his mistake: instead of investigating how certain uniformities of law may be at once indigenously subjective, i. e., originated by purely mental operations, and at the same time objective, i. e., actualised by the operations of material bodies in the concrete world of real existence, he jumps at the conclusion that all things ideal are necessarily purely subjective. The ideal, viz., all that belongs

[1] *Prolegomena*, § 2 ff.

to the realm of ideas, is subjective, but it has objective validity, and that which gives it objective validity is the mind's power of forming universal and necessary judgments. In fact, the terms universal and necessary would have no sense if they were limited to the realm of subjectivity and if objective validity did not imply true objectivity. Hence our aim is to explain the correspondence between the subjective and the objective, and we come to the conclusion that the *a priori* judgments are based upon the conditions of pure form, and form is a quality of the object as well as of the subject.

Thus while Kant's doctrine implies that

> the forms of intuition (space and time) and the formal laws are *a priori* in the mind; therefore they are purely subjective and the intuiting and thinking subject transfers them upon the objective world;

our position is the reverse.

What Kant calls *a priori* is purely formal; therefore the mind can produce its laws and theorems by purely mental operations, yet at the same time, being purely formal, they apply to objective reality as the formal conditions of all objects, and thus the operations of objects, as far as their formal conditions are concerned, bear a close analogy to the *a priori* theorems.

We construct the purely formal in our mind, but we do not create it. Nor are the propositions of mathematics a quality of space. We do not deduce the Pythagorean theorem from space, but we construct a right-angled triangle and investigate the results of our construction. Accordingly the theorems thus evolved are products of our mental operations executed on conditions given in our space conception. There are no mathematical theorems in the stellar universe, but there are conditions in the starry heavens which make it possible to calculate distances or other relations with the help of arithmetical computations and geometric constructions. And the conditions which make this possible can only be the objectivity of form implying that the *a priori* laws of subjective form as constructed in our mental models possess an objective validity.

THE OBJECTIVE ANALOGUES OF MENTAL CONSTRUCTIONS.

Zeno's paradox and the difficulties which Clifford found in the continuity conception of space, it seems to me, arise from a direct identification of the mental construction of space with the objective formal features of things that constitute what may be called objective space. Objective space is an inherent quality of things as the relational of their parts and is not, as in subjective space, a construction. The path of a body can be represented by a mathematical line, and a line is infinitely divisible; but for that reason it is not composed of infinite parts. Nor has a moving body to construct a line of an infinite number of infinitely minute parts by adding them piecemeal. The mental analysis and construction of a line is different from traversing it. For moving over a definite stretch of ground it is not necessary to go through the process of separately adding the imaginary infinitely small parts of which it is supposed to consist and into which it may be divided. It has not actually been divided, it is only infinitely divisible.

It is true that time (as time) is purely subjective, but there is a reality that corresponds to time. Time is the measure of motion. We count the running sand of the hour-glass, we divide the face of the sun-dial, we build a clock to determine the lapse of time. There is no time (as time) in the objective world, but there are motions, such as the revolutions of the earth round its axis, or round the sun, and these motions possess succession with definite duration, rendering time, viz., their determination, possible. Duration with succession of events in the world of things is the objective equivalent of time. The measurement of time is a subjective device.

The same is true of space as a conception of the extended world of things. There is no space conception in things, but bodies are extended; and their relation among themselves is an arrangement of innumerable juxtapositions. Extension, juxtaposition, direction of motion, is the objective quality of things that corresponds to the purely mental concept of space.

The untrained and philosophically crude man transfers subjec-

tive conceptions of things directly upon the objective world. He speaks of light and colors, of sounds, of time and numbers and things as existing outside of his mind; but a close inspection of the origin of mind will teach us to discriminate between sound and air waves, between colors and the cause of colors (produced by a commotion in the ether,—a reality whose existence is directly imperceptible and can only be deduced indirectly by argument). We shall learn by reflexion that geometrical lines are purely mental constructions, but that the paths of the stars possess qualities (viz., all those which depend upon purely formal conditions) that closely correspond to the conic sections of mathematics.

Further, it becomes obvious that our division of the world into separate things is artificial, for things are only clusters of predicates which impress us as being units. The truth is that the world is so constituted as to render a perfect separation impossible. Things are in a perpetual flux, and the limits between them are arbitrary. As the whole atmosphere and its pressure belong to our lungs, so the gravity of the sun is an integral part of the weight of the earth. Thus we can truly say that there are no separate things except in our minds where they are artificial divisions invented for the practical purpose of describing the world, of mapping out its parts, of comprehending its actions and having a means of adjusting ourselves to our surroundings.

Logic is purely mental, but there is something in the objective world that tallies with logic; we call it natural law, but the term law is misleading. There are no laws in nature, but only uniformities resulting from the condition that the purely formal is the same everywhere and that the same formal conditions will produce the same formal effects.

Purely formal laws are universally valid only as purely formal laws. Twice two will be four in all arithmetical systems of any possible rational being, and the statement is universally valid so far as pure forms are concerned. If we deal with actualities possessed of additional qualities where multiplication ceases to have its strict mathematical sense, the statement will no longer be tenable. The accumulation of power on a definite occasion may have

results that cannot be calculated by addition or multiplication. The associated wealth of twice two millions may far exceed four millions; and twice one half will never be one when we deal with iving organisms. All this is conceded. Ideal operations are purely mental and as such subjective, but for all that they possess objective validity which implies that there are objective features exhibiting close analogies, by being products of a fundamental sameness of conditions. This fundamental sameness is the universality of form which is common to both the domain of the objective world and the ideal realm of the mind, the thinking subject.

There are neither categories nor classes in the objective world, but the different modes of existence are classified by sentient beings and the scheme of the classification is the result. A reflexion upon our modes of thought objectifies them as modes of existence. The Platonic ideas, i. e., the eternal types of the various beings, do not possess a concrete existence as do, e. g., the moulds of a potter, but there are uniformities among the living forms which are obviously apparent. The doctrine of evolution proves that the lines of division between the types of beings are not so distinct in reality as they seem to be, and before a strictly scientific inspection they fade away as imaginary; yet they remain and are indispensable for our method of classification; and the unities which they represent justify us in speaking of objective features as corresponding to the mental conception of Platonic ideas.

THE ORIGIN OF GENERALISATIONS.

The sense-impressions of things are registered according to their difference of form. Every sense-impression runs along in the groove prepared for it by a former sense-impression. Thus the same is registered with the same, and similar ones are correlated. The result is a systematisation of sensory impressions, and the relations that obtain in this system which is built up in the natural course of growth, may appropriately be compared to the pigeon-holes of a methodically arranged cabinet. The difference between the cabinet with pigeon-holes and the human mind is this, that the former is artificial, the latter natural. The human mind with its

rationality has been developed according to mechanical law and the classification of sense-impressions is done by it as automatically as the distribution of the different letters in a type-distributing machine.

Our ideas, our names of things, our system of classification, are purely subjective, but there is an objective analogue of the eternal types, which consists in the uniformities of all possible formations. This is true of living creatures as well as of machines and other concepts of human fancy. In the domain of invention we know very well that the inventor sometimes creates a combination of parts never actualised before on earth; but the inventor is a finder: he is as much a discoverer as Columbus who found a new continent, or the scientist who succeeds in formulating an unknown law. America existed before Columbus, the law of gravitation held good before Newton, and the idea of a steam engine was a realisable combination before James Watts. It is a feature of objective existence that certain functions can be performed in perfectly definite interrelations. Such conditions which are actualised by a certain combination and disappear as soon as the combination is destroyed, are the objective features in things which justify the subjective idea of unities finding expression in concepts of things and beings.

THE IDEAS OF PURE REASON.

Kant grants the objective applicability of the categories, but he denies the validity of the ideas of pure reason, especially the cosmological, the psychological, and the theological idea. We are unable to follow Kant and are inclined to consider his three ideas of Pure Reason in the same light as time and space and the categories. The concept of unity is not a mere assumption but it has its correspondent analogue in reality[1] and has its practical use; only we must beware of treating unities as concrete objectivities, as separate and discrete entities, as things in themselves which have an objective existence apart from and independently of their

[1] Thus not only all organisms are unities, but also steam-engines, dynamos, or any machinery that would not work unless it were constructed of interacting parts in a definite way.

constituent parts. Thus the soul of man is as real on the assumption of an ego entity as on the theory of its denial. Life is as true whether or not vitalism can be established. The world is a great interrelated system, whether or not the uniformities of nature are called laws. There is a creation of the world, a formation of its life, a dispensation of its destinies, taking place, whether or not this ultimate norm of being be called God; the facts of the cosmic order remain the same on the assumptions of both theism and atheism. But obviously, this decision is not an endorsement of Kant's antinomies, but an explanation of his reasons for formulating them.

While we grant that there is a reality corresponding to Kant's three ideas of pure reason, we do not mean to say that there is a God such as the crude belief of an untrained mind represents him to be, nor further that there is a soul such as it is assumed to exist in the annals of superstition, nor finally that the crude notions of a cosmos, the limits of the world or its infinitude, its composition, its determinedness, and its absolute existence, should be such as abstract reason might arbitrarily construct: we only mean to say that there are factors in life which caused man to construct such mental images or ideas as are called God, soul, and world. The ideas may be wrong, but the factors which produced them are real, and the duty devolves upon theology, psychology, and cosmology to eliminate error and bring out the truth.

My objection to Kant's doctrine is not an objection to his terminology nor to idealism in general. We may form our world-view in an idealistic as well as a realistic nomenclature. Object may mean either the sense-woven picture or the outside thing which it signifies. We may say that the objective world is ideal, for such it is, meaning by objects the things as we see them. We may say that the objective world is real, meaning by objects the actual things represented in our sense-images. The nomenclature of a philosophical system is important but it is arbitrary. We may criticise it as impractical, but we cannot on its account reject a philosophy as untrue.

REALISM OR IDEALISM.

We object to Kant's doctrine of limiting form to the subject and thus denying the objective value of the ideal. We may define terms as we please, but we must remain consistent. If the objects are ideal, I gladly grant that the forms of the objects are ideal; but for all that, being forms of the objects, they are objective, as much as the objects themselves.

The sense-woven pictures of things, though subjective images, are the realities of life, and our concepts of things are symbols of them in terms of their formal features expressed according to schedules which we construct *a priori*. Time and space, the forms of our sense-world (of our *Anschauung*), accordingly are as real as these things, and I cannot say that the things themselves are real while the forms of things are purely ideal, i. e., not real.

Schopenhauer, a one-sided but nevertheless one of the most prominent and faithful disciples of Kant, defends Kantian idealism against the misinterpretations of the so-called realists in these sentences:

"In spite of all that one may say, nothing is so persistently and ever anew misunderstood as *Idealism*, because it is interpreted as meaning that one denies the *empirical* reality of the external world. Upon this rests the perpetual return to the appeal to common sense, which appears in many forms and guises; for example, as an 'irresistible conviction' in the Scotch school, or as Jacobi's *faith* in the reality of the external world. The external world by no means presents itself, as Jacobi declares, upon credit, and is accepted by us upon trust and faith. It presents itself as that which it is, and performs directly what it promises."[1]

THE SUBJECT AS ITS OWN OBJECT.

The quarrel between the idealists so called and the realists of Jacobi's stamp is purely a question of terminology. It is a vicious circle to ask whether the real is real; the question is, "What do we understand by real?" Now we agree with Kant in accepting *Anschauung* as real. Our perceptions are the data of experience,

[1] From Schopenhauer's *The World as Will and Idea*.

they are the facts of life about which there is no quibbling and the question of unreality originates only in the realm of abstract thought, viz., in the domain of interpretation. Perceptions are classified; perceptions of the same kind are subsumed under the general conception of their class and if a perception is misinterpreted, our notion concerning it is erroneous. An after-image is as real as the original perception, but it is called an illusion when it suggests the presence of an object; in other words when its cause is misinterpreted.

Perceptions accordingly are what we define as real, and space and time are, abstractly stated, the forms of perception. Time and space, accordingly, are as real as perceptions.

Now we may ask what are the objects of the perceptions, defining objects this time not as the sense-woven images of our perception inside our senses, but as the external presences which are supposed to cause them. Since it is impossible here to enter into a detailed epistemological discussion of the subject, we state the answer for brevity's sake dogmatically as follows: The objects (viz., the external presences which are supposed to cause perceptions) are, ultimately, i. e., in their inmost constitution, of the same nature as are the perceptions themselves. The perceptions in their totality are called the subject—which is a sentient body, an intricate organism consisting of different organs of sense and a superadded organ of thought for preserving the sense-images, collating them, classifying them, and interpreting them. We are a system of perceptions and impulses, guided by memories and thoughts, but we represent ourselves in our own perception as a body in time and space. Thus our representation of ourselves is our self-perception, i. e., a representation of the subject as its own object, and our self-perception is as real as are perceptions in general. Succession of sense-impressions and reactions thereupon, accordingly, form part and parcel of our subject as its own object; and in the same way, juxtaposition of organs is an attribute of our self, not as it is as a subject in itself, but of our self as it represents itself as its own object. Other objects are in the same predicament and partake of the same nature. If time and space are the forms of

objectified subject, viz., of our own bodily existence, we have good reasons to ascribe objectivity to the facts from which the ideas of time and space are derived, viz., to extension and succession.

THE OBJECTIVE ORIGIN OF SPACE AND TIME.

It is true that the factors which generate in the mind our conceptions of time and space, together with the entire formal aspect of being, lie in the subject, in the sentient thinking being, but they lie not in the abstract subject in itself, not in the subjectivity of the subject, not in the quality of the subject which remains when all other qualities, i. e., the objective features of its own actualisation as a concrete being, are omitted by the process of abstraction, i. e., when they have been cancelled in thought. The subject in itself will be found to be an empty generalisation which contains nothing but a product of our analysis of perception, the bare idea of the perceiving in contrast to the perceived. It contains nothing either *a priori* or *a posteriori;* merely itself, the shadow of a thing. But the actual subject, which is an object in the objective world, exists somewhere in space and in a given time. It moves, i. e., it changes its position. It consists of juxtaposed organs and its experiences exhibit a definite succession, each act having its own definite duration. Therefore we do not hesitate, when drawing a line of demarcation between the subjective and the objective features of the thinking subject, to include its form together with its bodily objectivation in the realm of objectivity. In this way it happens that time and space may be called subjective, because the objectified subject finds them *a priori* in itself, but their ultimate root lies in the domain of objectivity, and we can therefore just as well call them objective, because they are the forms of the objective world and originate in the subject only because it is an object belonging to the objective world.

UNIVERSALITY DUE TO SYSTEMATISATION.

Kant was puzzled mainly by the subjective apriority of the laws of time and space and of all other formal relations, but this puzzling apriority is, closely considered, nothing but their general

applicability to all possible experience, which is due to the fact that all formal relations admit of systematisation. Formal possibilities can be exhausted and purely formal statements apply to *all* pure forms. Hence they possess universality, and universality admits of no exception, hence it implies necessity, which involves *a priori* applicability.

It is true (as Kant says) that purely formal knowledge is empty; but we know at the same time that the purely formal knowledge gives system to the empirical, to the sense-given facts of our experience. If we could not classify sense-impressions, they would remain a useless chaos, and human reason would not have developed. Kant expresses this truth by saying that the sensory impressions without the guidance of the purely formal are blind.

But as the formative norms of the objective world shape things and make them such as they are, our formal cognition classifies sense-impression according to their forms and thus makes a knowledge of objects possible. Our formal cognition is not the cause of the objective uniformities (as Kant suggests) but one of their applications only, being, as it were, their own reflexion in the consciousness of a sentient being. By being systematised in the shape of formulas, they apply *a priori* to experience and become in this way a key, with the help of which we can unlock the closed doors of the mysteries of nature and decipher the riddles of the universe.

THE REAL AND THE SUPERREAL.

We may call the eternal norms of existence which condition the formation of things "being" or "*Sein*" and the concrete actualisation of the types of being their "becoming," *Werden* or *Dasein*. We become acquainted with the norms of existence, part of which are formulated as natural laws, by abstraction and generalisation, but for that reason they are not mere glittering generalities, abstract nonentities, or unreal inventions, but significant features of objective existence, depicting not accidental but necessary uniformities. While we concede that the world of becoming is real, we must grant that the realm of being is superreal. Both *Sein* and *Werden*, Being and Becoming, are real; but the reality of the two

is different in kind. The latter's reality is actualisation, the reality of the former is eternality. Thus the former is immutable, the latter a perpetual flux. The fleeting realities of sense are definite objects in the objective world, but the norms of eternal being are the formative factors which shape them.

Obviously the eternal norms of existence, which are identical with the purely formal laws constituting the cosmic order, though not material facts, are the most effective presences of the world. They are not only real, they are superreal. They remain the same whether realised or not in the actual world. They produce the cosmic order, render the rise of rational beings possible, they are the condition of the intelligibility of things, they are the prototype of mind and spirituality, they are the corner-stone of both science and ethics and constitute Kant's *mundus intelligibilis*—the realm of spiritual being; Swedenborg's sphere of spirits, of angels, and archangels; the kingdom of God, to be realised on earth; yea, God himself, for God is all these norms in their totality and systematic unity. In Lao-Tze's philosophy it is the eternal Tao, the world-reason or primordial Logos. In Buddhist metaphysics it corresponds to Açvaghosha's Tathâgatagarbha, i. e., the womb of Buddhahood and the origin of all things; to Amitâbha, the source of all light and wisdom, and also to the deathless, the uncreate, the non-corporeal existence (*arûpa*), the Nirvâna of the older Buddhists.

NOUMENA.

The data of experience are sensations, or sense-perceptions, which represent themselves as images of things in time and space. The sensory element of the images, which is conditioned by the material composition of the sentient subject, is purely subjective and need not be uniform. Thus we know that colors are perceived differently by different eyes; the color-blind see the world like a steel-engraving, or rather a wash-picture, gray in gray. To the red-blind red appears green, to the green-blind red appears dark yellow and green pale yellow. If all men were color-blind, the gray image would have to be regarded as normal. The forms of

things, too, are conditioned to some extent by the material composition of our sense-organs, as much so as the picture on the sensitive plate of a photographer's camera depends upon the lens. Further, we see not things as they are, but as they are projected according to the laws of perspective. But we can from the given data of the projected images and additional considerations of other data of experience reconstruct the form and structure of things as they are in space and of the events as they and their accelerations take place in time. This construction of things is called in Kant's terminology things as creations of thought, or noumena, and the noumena are intended as models of the objects themselves, for they mean to depict things in their objective nature, as they are after the elimination of all subjective elements of cognition. Accordingly noumena (as noumena) are scientific notions, products of reasoning, and subjective in a higher degree even than sense-perceptions. They are the interpretations of the sense-perceptions and are as such ideal, i. e., representations not things. But they represent things as they are, independent of the senses of the sentient subject. Noumena would be unmeaning, if they did not represent objective realities, if they were purely fictitious, if they did not portray the things as objects in the objective world. We may fitly call the realities for whose designation noumena (i. e., scientific concepts) have been invented objects, or more definitely, objects in themselves.

They constitute the realm of experience, and time and space are the generalised modes of their existence by which we determine their formal qualities. Nothing is real in the sense of concrete existence, except it be in time and space. Accordingly time and space (though not objects but mere forms) are objective qualities of things, and without time and space concrete things cease to be concretely real and become either mere ideas or nonentities.

We may with Kant distinguish between thing and thing in itself and may understand by the latter the eternal foundation of the thing, its metaphysical *raison d'être*, whatever that may mean (either its Platonic idea, its eternal type, or the Schopenhauerian conception of its "will to be," or the general and abstract idea of

its existence), but under all conditions space and time belong (as Kant says) to the things as appearances, viz., the things as objects in the objective world which implies (the contrary to that which Kant says) that they are not purely subjective, but objective.

THE OBJECTIVITY OF SPACE AND TIME.

Now we may call the perpetual flux of concrete objects "appearance," and the domain of eternal being "the real things": in that case the real things come to appearance by becoming actual in time and space. In this sense we agree with Kant, that time and space are real for our experience, though not for our experience alone, but for any experience. Every sentient subject, in so far as it is sentient, every individual man, is not a subject pure and simple, but an actualised subject, an objectified thing, for all acts of cognition are acts of an objective significance, taking place in the domain of objective existence, as an interrelation between two or several objects. One party to this interrelation (viz., my bodily organisation) happens to be the sentient and thinking subject, but that alters nothing in the case, for all its actions take place in time, and the concrete corporeality of its organs is somewhere in space. Again therefore we come to the conclusion that space and time appertain (as Kant says) to the appearances of things. They appertain to the subject, not in itself, but to the appearance of the subject, viz., to its objectivation; accordingly they are (as opposed to what Kant says) objective, not purely subjective, and may be called subjective only in a special sense, viz., in so far as they appertain to the objectified subject, which, however, is an object like any other object in the objective world. The subject does not transfer time and space into the objective world, but anything that becomes actual thereby makes its appearance in time and space. In other words, Time, Space, and all the norms of purely formal relations, are the forms of any possible concrete existence. Whatever the metaphysical *raison d'être* of things may be, the "why there is anything," reality, when actualised, represents itself objectively as being in time and space. The thinking subject does not represent things in time and space, but in so far as it is an actual object

in the objective world, it represents itself (i. e., it appears) in time and space. So do all other things: hence the concurrence of the formal notions of the objectified subject with the formal conditions of the objectified things of our surroundings. Kant says (§ 52*c*):

> "Space and time together with the appearances in them are nothing existing in themselves and outside of my representations but are themselves only modes of representation."[1]

He should have said (and here we use purposely Kant's own term "appearance"[2]):

> Time and space are modes of appearance, viz., of self-representation.

Being modes of appearance they are inside every subject in so far as it has made its appearance in the objective world. They are in all objects as those relational features which determine the juxtaposition of things. It is the actualised appearance that needs extension (i. e., space) for the distribution of the several organs of the thinking subject. We feel our limbs as being in different places, as moving about, as touching, as separating, etc., and these feelings are parts of our soul: they are the inside of the subject which is objectified (or comes to appearance) in our bodily existence. Our body (viz., our self as appearance) is extended, and the space needed for it is limited by the skin. The remainder of extension

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[1] It is very strange that the same Kant who says that space (viz., extension) is only a mode of representation declares (in § 2) that the sentence "bodies are extended" is analytical; accordingly he regards extension or space as the essential feature of a thing, of an object. Why then does he not recognise space as the mark of objectivism, which might have led him to concede the objective nature of the operations of the thinking subject?

[2] Appearance or phenomenon means originally the picture of objects as it appears on the retina and generally all the data of sense-perception; but the word is used in contrast to noumenon, or abstract thought, denoting the concrete object as it is given to the senses distinguished from its general abstract idea. Thus, the world of appearances means the concrete world of objects that affect our senses, though the term might be interpreted to stand for the retinal picture as a mere subjective image in contrast to the material world of objective reality. Indeed, there are authors who do use the word in the latter sense, while in the minds of most readers the two conceptions are mixed and the former is imperceptibly affected by the latter. It would not be difficult to point out what an interminable confusion the use of this word has produced in philosophy.

which accommodates the other objects of the surrounding world is designated as the outside; and if the extension within our skin is real, the outside must also be real. Both together constitute space.

When Kant denies that space and time are objective, he becomes confused and self-contradictory. For he would either have to say that space and time are limited within the boundary of the body of the thinking subject, which is nonsense, or he must attribute them to the subject as a thing in itself, which contradicts his own theory according to which time and space do not refer to things in themselves, but to appearances only. Thus even from Kant's own premises and when employing his own terminology the theory becomes untenable that space and time are purely subjective attributes. Their very nature is objectivity, and if objects are appearances, time and space as the forms of all appearance must be regarded as features of existence which in their very nature are objective.

It appears that Kant was not sufficiently careful to distinguish between space-conception, which is subjective, and space itself, which, being the juxtaposition of things and their parts, is objective. Space-conception originates from within sentient organisms, viz., in the mind, by its adjustment to the surrounding world through the use of its organs. Its ultimate sources are of a physiological nature consisting in the motion of the limbs and especially the eyes. This is what Ernst Mach calls physiological space.[1] Mathematical space is a higher abstraction than physiological space. In mathematical space all incidental features, the differences of right and left, of high and low, etc., are dropped, and space is regarded as homaloidal, viz., as constituted alike throughout. The homaloidality of space is the simplest way of depriving space of all positive attributes, of rendering it the "same" throughout. At any rate it is a mental construction as much as the idea of a straight line and all geometrical figures. The construction has been made without any concrete building material, with mere mental operations, simply by

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[1] See Ernst Mach's article "On Physiological, as Distinguished from Geometrical, Space," in *The Monist*, Vol. XI., No. 3, April, 1901.

proceeding on the assumption of logical consistency, where the same procedure yields the same result. That other space constructions are possible need not concern us here. At any rate, our space-conception is built up in the thinking subject by operations of which it is possessed in its capacity as an object moving about in the objective world. Our space-conception is a noumenon (a product of thought), and like all noumena, it is intended to describe features of objective reality; and these features of objective reality intended to be delineated in our space-conception is objective space—viz., the extension of the world and of its parts, the juxtaposition of bodies, and the range of directions all around every moving point.

Our space-conception is subjective, but for that reason space itself remains as objective as any object in space. Moreover, the data from which our space-conception has been constructed are as objective as are all the acts and facts of our bodily organism.

THINGS IN THEMSELVES.

Where, then, are the things in themselves, which, according to Kant, remain unintelligible?

There is a truth in the idea that our mind is so constituted as to transfer to the phenomenal world its *a priori* notions of time and space and its thought-forms. The world of our senses which appears to us as the objective world that surrounds us, is truly a construction of our organs of sense; the construction is as necessary as is for example the reflexion of a picture in a mirror; things in themselves remain outside. In this sense Kant's doctrine of idealism is undeniably true.

But Kant goes further in saying that things in themselves, meaning things viewed independently of our sense-perception, do not partake of form and are therefore unknowable. But what is knowledge if not a correct description of things? Things are mirrored in our eyes, and abstract notions are formed to represent them in mental symbols. It would be absurd to expect that things should bodily migrate into our heads.

It is the ideal of science to eliminate the subjectivity of the

thinking subject and construct a world-picture in terms of formal laws, by the guidance of the several sciences of formal thought; this is the noumenal world, the world of thought; but this noumenal world is nothing but a picture (more or less accurate) of the objective world as things are independently of sense-perception. Here everything changes into motion of a definite form; the rainbow with the warm beauty of its colors becomes the reflexion of ether waves of a definite angle with definite wave-lengths. Though the noumenon is a subjective construction, it is an analogue of the objects as they are in themselves, describing their suchness. Accordingly, this would be a cognition of things in themselves, for Kant defines things in themselves as the ground which determines our sensibility to have sense-perceptions, or briefly the causes of phenomena.

Cognition is nothing more nor less than the construction of analogous symbols of things by which we can know their nature for the sake of determining their action, thus enabling us to direct the course of events by adaptation partly of ourselves to conditions, partly of our surroundings to our wants. Unless we denounce science as a vagary of the human mind, we must grant that in spite of the shortcomings of the individual scientist, the ideal of science (which consists in describing things in their objective existence) is justified, and can be more and more realised.

And what becomes of things in themselves?

If things in themselves cannot be described with the assistance of formal thoughts, they degenerate into dim chimerical and contradictory notions, such as unextended bodies, or substances without qualities, or unmaterial entities, or causes which remain outside the pale of causation.

The conception of things in themselves is a vagary of pre-Kantian metaphysics, the empty shell of which, as an irrational quantity, transcendent and unknowable, was by some mishap suffered to remain in Kant's philosophy.

If things in themselves mean objective things, viz., things as they are, independently of our sensibility, we must deny that they are unknowable. If they mean that which constitutes the essential

character of the things, making them what they are, they will be seen to be determined by their suchness; they are what Plato called the eternal types of being, or ideas; and we ought to call them not "things in themselves," but "forms in themselves."

Schopenhauer interprets the Kantian conception of things in themselves as the metaphysical *raison d'être* of their existence, but he denies that its nature cannot be known and discovers its manifestation in "the Will." According to him it is the Will that makes every one what he is, and Schopenhauer's Will is not the physiological process of willing, the conscious effort of causing an idea to pass into an act, but the tendency to motion such as it inheres in all existence, in the stone as gravity, in chemicals as affinity, in sentient beings as desire. He expressly excludes that feature which distinguishes will from unconscious motions, viz., intelligence, and speaks of the blind Will. The blind Will is practically deified by him, for it is supposed to be above time and space and credited with creative omnipotence. In reality it is nothing but the widest generalisation of motion.

Clifford offers another interpretation of the term "thing in itself," viz., the sentiency of organised beings, constituting their subjectivity and corresponding to what in man is called his "soul." But, again, this subjectivity, the spiritual inside, is always the sentient accompaniment of the organisation, the bodily outside; and its nature can be determined by studying the visible exponents of its objective expression in which it is realised. Thus Clifford's things in themselves are as little unknowable as Schopenhauer's.

Agnosticism, the egg-shell of metaphysicism, prevented Kant from taking the last step suggested by his doctrine of the necessity and universality of the laws of pure form. He lost himself in contradictions and became satisfied with his statement of the antinomies of pure reason, according to which we may prove with equal plausibility that God exists or that he does not.

THE GOD-PROBLEM.

If Kant had followed the course which we here, under the guidance of the principles laid out by him, have briefly sketched

out, his philosophy not only would have become less artificial and remained in close touch with the natural sciences, but it would also have helped theology to develop purer, truer, and nobler religious ideals. With the egg-shell of agnosticism on its back, Kantism was satisfied with the existing state of beliefs and things; not that Kant endorsed the various irrationalities of the Christianity of his day, the literalism of dogma, the implicit belief in the very text of the Bible, the Creation story, paternalism of the Prussian State Church, etc.; he criticised them occasionally in mild terms; but instead of going to work to purify religion (not in the narrow and prosaic spirit of his disciples, the Rationalists, but with due reverence for the poetry of dogma and legend, and at the same time with a consideration for the practical needs of the heart): he simply justified them in general terms on account of their moral usefulness in his *Critique of Practical Reason.*

As an instance, let us point out his unsatisfactory solution of the God problem.

Kant accepted in his conception of God the traditional views of the Church, and discussed it as one of the several metaphysical notions, the result being that the idea is pronounced to be transcendent, and we can with equally plausible reasons both affirm and deny his existence. It is one of Kant's four antinomies of Pure Reason. But God unknown to pure reason and not discoverable in the domain of experience and resuscitated only as a postulate of practical reason, is a poor substitute even for the mythological conception of the god of the uneducated masses. An hypothetical god cannot help; he is sicklied over with the pale cast of thought; he is not real; he is paralysed. I am far from blaming Kant, who has done so much for philosophy, for not having done more and performed a reformer's work for religion; but I would suggest that he might as well from his own principles have investigated the nature of formal laws, which in the subjective sphere of reason appear as transcendental ideas, and have come to the conclusion that a truer God-conception could be derived therefrom, which then would commend itself as the higher ideal. The popular notions of the several religions and also of a primitive theology are dim fore-

shadowings of a scientific God-conception, the purity of which is increasing with the progress of scientific truth.

The world-order, that purely formal law in the objective world which forms and creates, shaping the stellar universe (as Kant set forth so forcibly in his *General Natural History and Theory of the Heavens*), and revealing itself in the social development of man as the power that makes for righteousness, must have made its influence felt in the life of mankind at the very beginning, and would naturally, according to the practical needs of the intelligence of the successive ages, assume the shape of a conception of God, more or less crude in the beginning, and more or less philosophical in the mind of the wise. The world-order, this superpersonal spirituality that acts as the divine dispensation in the world, is hyperphysical (I purposely avoid the much-abused term "supernatural," but I might as well say supernatural). It is intrinsically necessary, it is omnipresent, it is unerring in the truth of its various applications which form as it were a grand system, comparable to the articulated differentiation of a spiritual organism,—a personality; it is as unfailingly just as the law of causation is rigid; and every God-conception is but an attempt at comprehending its moral significance.

The fetishist's notion of a power to which he must conform is not absolutely wrong. It contains a truth, but is alloyed with superstitions. The idea of thinking of God as a king of kings, as a supreme judge, is more advanced, inasmuch as God henceforth represents a moral maxim, the principle of justice in the world. The God-father idea of Christianity surpasses the theology of the prophets of the Old Testament, but it, too, falls short of the truth in all its perfection. All we have to do is to be serious in scientifically thinking the divine attributes of omnipresence, of eternality, of infinitude, of omniscience, of all-justice, of the irrefragability of law in the physical, the psychical, and the social spheres of existence, which, reflected in the instructive growth of his conscience, become to man the moral norm of life, and the ultimate authority of conduct.

Kant cited the religious notions of the theology of his age be-

fore the tribunal of pure reason and dismissed the suit as offering no issue, leaving the question in the state in which he had found it. He would have served his age better had he worked out the philosophical significance of the idea of God, on the basis of the practical significance of his Transcendentalism; he would then, instead of leaving the problem unsolved, have boldly propounded the gospel of the superpersonal God as coming, not to destroy the old theology, but to fulfil its yearnings and hopes, without in the least doing violence to the demands of criticism and scientific exactness.

EDITOR.

PSYCHOLOGY AND HISTORY.[1]

NO study has had a more rapid development in recent years, or is now engaging more attention, than psychology. Its principles, laws, and methods are all discussed with more or less competency. A few of the moral sciences have attempted and in part succeeded in renewing themselves upon a psychological basis. Even philosophic systems which once were built mainly on ontological conceptions, are now constrained to take a large part in the consideration of the processes of consciousness, which are more and more considered as the necessary point of departure in the discussion of all philosophic problems. Now, given the generally recognised importance which psychological investigations have in our day acquired, it may not be useless to examine the results at which they have arrived, not so much with respect to psychology itself as with regard to knowledge in general. For the measure of value which a science possesses is found in the last analysis not only in its contribution to a precise knowledge of the facts, but also in the degree in which it influences our general conception of the facts themselves.

The first thing to be considered in a science, that without which it can never arrive at definite and ordered results, that indeed which distinguishes science from empiricism, is its method of investigation. The scientific renaissance of the sixteenth and seventeenth centuries was largely the product of a new critical tendency of thought which took the form of a new and more rational method.

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[1] Translated from the manuscript of G. Villa by I. W. Howerth, Ph. D., of the University of Chicago.

The historical method in its turn revived the interest in the historical and philological sciences, previously encumbered by rhetorical and pragmatical preconceptions which prevented them from fulfilling their highest function, that is, the gaining of a scientific and objective knowledge of the facts. I need only mention the recent progress of economics, thanks to the application of rigorous methods. Now, is psychology able to boast of the progress in its methods, and hence of the wealth and precision of results which the other moral sciences have reached? It is not a bold affirmation to say that it has not.

The causes of the uncertainty of method in which psychology is yet entangled, and hence of its slow progress in comparison with that of many of the historical, philological, and social sciences, are very complex, and I have examined them elsewhere somewhat more minutely than I am able to do here.[1] But however various and complex these causes may be, they may all be reduced to a single fundamental one, and that is the vastness of the field which psychology attempts to cover. While sociology, psychology, political economy, philology, and law, study only special phases of the manifestations of the human intellect, feeling and will, psychology embraces the entire domain of these phenomena and strives to reduce them all to general principles. Moreover, it has not only to roam over this vast field whose limits are so extraordinarily extended in time and space, but it must also proceed beyond the confines of human activity, and trace step by step the formation and development of the processes of knowledge in the lower animals, which processes are naturally related to those of man. In the history of man himself psychology must follow the progressive evolution of his mental activity in such a way that out of all these comparative studies may issue some general principle which may serve to explain how the consciousness of civilised man has been developed. Not only must psychology study the psychic aspect of organic beings, but it must also investigate the relations which exist between the processes of knowledge and corporeal phenomena. It

[1] See my volume *La psicologia contemporanea*. Turin, Fratelli Bocca, 1899,

must investigate the structure and function of those organs which stand in direct relation to these processes, and penetrate into the most burning and profound questions of the fundamental science of all vital phenomena, that is, biology. Hence psychology touches upon every side the principles upon which both the moral and the natural sciences are founded. From this complexity of its relations arises its variety of method, and the difficulty of making its methods converge toward a single end.

The most ancient method that we find in the history of psychology is the so-called method of introspection as it was for a long time practised. This method, although it led some philosophers to a profound insight into human knowledge, was almost always bound up with philosophic speculation upon which the examination of psychic facts was made directly to depend. The insufficiency of this method, shown so clearly by modern psychologists, is too evident to need demonstration. Pure introspection leads inevitably to an illusion, and if it happens to produce something useful it is only the fruit of a casual and happy intuition, and not the result of a scientific procedure. Its results are the product of art, not of science. To remedy the defects and the errors of this introspective method, so dear to the ancient spiritualistic philosophers, psychology and all modern positive philosophy are trying to follow the same path upon which the biological sciences have entered, and which has already led them to such great success. That is to say, psychology is attempting to apply physiological experimentation to the processes of knowledge. It is thus that the young science expects to open for itself a new era! Materialistic philosophy seems to be delivered over to these researches and cries aloud that no other form of psychology except physiological psychology is possible; and that final explanation of psychic facts is to be found only in cerebral phenomena, which, according to that philosophy, represent the real basis of what appears to us under the aspect of conscious phenomena. Although this opinion is now somewhat shaken, both on account of the declining progress of materialistic philosophy, and also by the clearest demonstrations of the greatest representatives of physiological psychology, who have repeated

over and over that the final end of experimental psychology is the knowledge of psychic processes, and that it has nothing in common with physiology except the use of certain means of experimentation, it may still be said that the materialistic interpretation of the new methods of psychology is rooted in many minds, especially among students of the natural sciences and of medicine. The exertions of certain psychologists and philosophers, however, have not prevented the new experimental science from following the proper tendency and methods. It has begun to distinguish its own ends from those of physiology, and has thus rapidly increased its appropriate researches in almost the whole domain of the elementary psychic processes, and has engaged the attention, especially in some countries, of a numerous class of students. But unfortunately, while the minute work of analysis has led in some sciences, as for example in the philological sciences, to important results which have radically reformed the general conceptions and principles upon which they are founded, in experimental psychology nothing similar has yet taken place, nor seems likely to take place for some time to come. The facts and laws established upon even a relatively firm foundation are yet very few. Many of them are yet the subject of lively discussion and cannot be reduced to any general and constant principle. While there is a relative agreement among experimental psychologists in respect to certain methods of research, there is a great divergence of opinion among them concerning the aims and limits of their science. Some believe, and with reason, that the desire to extend experimentation down to the elementary psychic processes cannot lead to any positive result, and does not correspond to the true aim which psychology should set up. Others, still holding to the old materialistic ideas which under the name of psycho-physical materialism strive to hold their place in experimental psychology, attempt to subject the whole vast field of psychic processes of the individual to the experimental, even the physiological, method. The effect of these discussions makes itself felt in psychology. The diversity of psychological opinion and principles is sometimes a cause and sometimes a consequence of these different and even opposed tendencies in

method. It will be sufficient to recall in this connexion the example of certain experimental psychologists who attempt to reduce the processes of feeling and will to muscular sensation, attempts which are strongly combated by other experimenters.

Positive and evolutionary philosophy, moreover, upholds against the old spiritualistic psychology, and perhaps more firmly, another method of external observation, that is, the social, which consists in the study of the collective productions of the human consciousness as they are manifested in history and in social institutions. This branch of psychology, growing out of the various social sciences, philological and natural, like ethnography, sociology, the history of religions and of language, and anthropology, has taken the name of social psychology. But if the limits of experimental psychology are indefinite, those of this other psychological method are still more so. As the founders of this new science came from the ranks of workers in the special sciences and philosophy, the new science is influenced by the methods pursued in these special studies. Thus it is that social psychology may approach the philosophy of history, or linguistics, or sociology, or anthropology, or ethnography. The positive philosophers are inclined to make it a kind of sociology. With some of them, indeed, sociology and social psychology are identical. On the other hand, the philosophers who approach it with spiritualistic theories, wish to assimilate it to the philosophy of history, which in its turn has been reduced by the positive philosophers to sociology. The philologists seek to found social psychology upon the science of language, the anthropologists upon ethnography, etc. While some years have passed since Lazarus and Steinthal, in 1855, began the publication of studies in ethnographical psychology in their celebrated periodical, it cannot be said that great progress has been made in the delimitation of the new science. Even to-day the confusion in this domain is very great, and every new treatise on the subject advances new criteria and new principles.

In addition to these two principal methods, scientific psychology has evolved others which are to some extent related to them. These may be found in the so-called child psychology, animal psy-

chology, and pathological psychology. It is indisputable that every one of these psychological methods has produced valuable results. It cannot be said, however, that they so well accord with the two principal psychological methods as to bringing forth the results which might be hoped for. The majority of the students of child psychology and animal psychology proceed empirically, caring little about following the procedure of experimental and social psychology.[1] Hence it is not a rare thing to find some of these psychologists who have the naïve conviction that they are presenting new and important ideas, and who do not seem to be aware that their theories are long since antiquated and displaced by others corresponding better to the facts. As to the cultivators of pathological psychology, they are for the most part, with splendid exceptions, psychiatrists who have passed over from the study of physiology and histology without any special preparation for the study of mental processes.

From all this it may be seen that we are yet far from a union of the various psychological methods, from which union alone may issue a new, solid and organic science. To all these uncertainties and discordances in method might be added the confusion of thought which has brought forth some philosophical doctrines which have arisen from time to time, and even in our day in which general philosophy is held in so little consideration. On account of the very great importance of psychology it is to contemporary philosophers a special object of criticism and discussion. Not all of these philosophers are careful to study the methods and results of scientific psychology, but for the most part discuss the matter with purely subjective criteria. Such discussions and criticisms serve only to delay the progress of the young science.

Reference to all these unfavorable conditions of modern psychology ought not to lead to the conclusion that no hope may be cherished in regard to a unity of method. That would be a hasty and erroneous conclusion. The clear presentation of the difficulties

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[1] A splendid exception, so far as child psychology is concerned, is presented in J. Mark Baldwin's *Mental Development in the Child and the Race*.

which psychology has yet to overcome before arriving at its true scope, ought to be a means of reaching a large and just comprehension of its nature, and therefore of its methods. Now what is the final scope towards which these various methods ought to converge? And why is it thought necessary to write about it and to discuss it so much?

The answer to these questions must be sought in the fact that we intuitively feel more or less clearly that psychology must be something more than the experimental and minute examination of the elementary processes of knowledge, of sensation, of representation, of simple feeling, and of the acts of reason. It must be the study of the mind considered in all its manifestations, not only in the individual, but also in history.[1] It is felt, in short, that the importance of the new science lies in the fact that it is fundamental to all those disciplines which are called moral.

It is well known that the historical, philological, juridical, economical, and social sciences have had such a remarkable development in the last century that it constitutes one of the most salient features of our age. The so-called moral studies have risen to the rank of sciences. They have been forced more and more to rival in exactness the physical and natural sciences, and they have already arrived at results which may be considered as definite acquisitions of knowledge. The historical method has put these sciences in the way of the exact researches which has led to the establishment in the domain of history, civil, artistic, literary, religious, juridical, economic, and social, of a great number of new data and facts. It has led us to change radically our conceptions in regard to the origin of social institutions, and artistic and literary manifestations; and in fine to free all these studies from philosophic and moral preconceptions, endeavoring with some success to consider them with the same objectivity with which naturalists are now studying natural phenomena. But the historical method, while immensely beneficial to the moral sciences, has always been held

[1] This is pointed out by George Trumbell Ladd in an article in the *Psychological Review* for March 1899 on "Certain Hindrances to the Progress of Psychology in America."

to a general rather than an empirical procedure, caring little about investigating all the manifestations of the human mind, the reciprocal relations of which that method had clearly put into relief. It should be able to lead us to some general principle, to some fundamental law which might give us the key to the explanation of all these phenomena. The historical method, in short, has given more attention to the description and exposition of the facts than to their explanation. It has been held more to a descriptive and narrational procedure than to an explanatory. The recent advances in the methods of psychology, some of which, as for instance social psychology, are found in more direct contact with the historical and social sciences—have in fact arisen from them—should naturally lead us to a result which may explain all the manifestations of the collective consciousness, which are studied in the moral sciences by means of certain general principles which ought to be common to all peoples and to all ages, and which ought, moreover, to be found both in the individual and in the species. This co-ordination of all the moral sciences under general and common principles is an indispensable need of human thought, which always tries to unify and simplify the complexity of facts which it finds before it. Hence it is natural that the moral sciences, after having worked for many years to examine, ascertain, and establish facts, should now give attention to a very important question for the theory of knowledge, namely, the question in regard to the relations existing between the fundamental principles of each of them and the fundamental principles common to them all.

There is no doubt that if we could arrive at a solution of this problem, and arrange all the sciences of the mind in a logical and rational system, they would receive a new and a great impetus, and would finally arrive at what has always been their highest aim, namely, the explanation of the facts which they have established. The physical and biological sciences have already passed through their crisis, and now present a marvellous unity which rests solidly upon the basis of the general principles of dynamics. Such a basis for the moral sciences may be found in psychology. Already there has arisen in the moral sciences, especially in the juridical and so-

cial, a reaction against the somewhat empirical method of the historical school, and the works of Jhering, Wagner, Tarde, Simmel, Giddings, and others seek to found law, political economy, and sociology upon the principles of psychology. This tendency finds authoritative expression in profound philosophical works in which there is drawn up a complete classification of the sciences, and which contain a criticism of all their methods. Such works are the *Logics* of Wundt and of Sigwart. This doctrine ought to be accepted by philosophers and psychologists, for it gives a reason to hope that the contemporary movement in the moral sciences, especially in some countries where scientific thought is very active, as in learned Germany and in the young United States, is following a very decided psychological tendency, even in those moral sciences which, like political economy, show themselves least inclined to it.

The so-called historical school had clearly seen the fact, of extraordinary importance in general knowledge, that historical events, social and religious institutions, language and all the artistic and literary productions of a people are not created by the work of a few isolated individuals, but are the results of the long laborious work of many generations, upon which work the genius puts the final stamp. All manifestations of the collective consciousness of a people are therefore historical facts, and so history becomes the typical science to which all the other moral sciences should conform. All historical events must therefore be conceived as results of a complexity of precedent and concomitant circumstances, and hence the real importance of the individual factor is much diminished. Civil history itself, which seems to be more the result of individual action and hence less easy than other forms of history to be scientifically explained, presents itself under a new aspect, and the explanation of historical events is now sought, not in the psychological motives of the most conspicuous personages, but in the general ethnic, political, social, and religious conditions of the age in which the events took place. Now that the historical method is supplemented by the psychological, we may hope that history may one day become a new science, and that it may arrive at a true explanation of the facts which it studies.

It sometimes happens, however, in the domain of thought that things take an unforseen direction, and that which appears as undisputed truth to-day may to-morrow be put aside and in its place we may find other opinions which were thought to have been dead forever, and which are now restored under a new form to the honor and rank of incontestable truth. While a few years ago the sociological conception of history was admitted by almost all historians and philosophers, it has now begun to be doubted, and they are seeking to find the limits of scientific explanation in history and to ascertain what part artistic intuition plays in it. More and more discussions and treatises show signs of the change which is going on in the conception of the historical figures which have emerged from innumerable crowds of obscure and secondary men. It appears that humanity feels once more the necessity of admiring the "hero," and of restoring the legendary aureole which the critic had stripped from him, and is turning to the belief that to him alone is due all sudden changes in circumstances and in institutions. This is illustrated by the revival of the Napoleonic legend, and by the interest taken in the doings of great men. Against the exaggeration of the sociological method now employed in positive philosophy, and which allows too little importance in history to the individual factor, has now arisen an individualistic tendency which divides even the sociologists themselves. Some among them, like Gabriel Tarde, maintain resolutely the importance of the individual genius in the origin of social institutions.[1] Others, like Ludwig Gumplowicz, accurately distinguish history from sociology. Only the latter, according to this author, can aspire to the rank of a science. History, he thinks, is condemned to remain forever a form of art, and cannot therefore have any other scope beyond that of procuring æsthetic pleasure.[2] Thus arises once more the famous

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[1] See among the numerous works of this author his paper entitled "La Sociologie" in *Etudes de psychologie sociale*, 1898.

[2] See Gumplowicz, *Sociologie und Politik*, 1892. Ratzenhofer (*Die sociologische Erkenntniss*, Leipsic, 1898) also maintains that it is impossible for history ever to become a true science. P. Barth is of the same opinion. See his "Fragen der Geschichtswissenschaft," in the October number of *Vierteljahrsschrift für wissenschaftliche Philosophie.*

theory of Schopenhauer, according to which history can never become a science for the reason that the facts which it discusses cannot be subordinated to any general laws.

All these tendencies which are manifested in the special sciences, historical and sociological, have, as might be expected, a sensible echo in philosophy. For some years there has been an attempt upon the part of some philosophers to build up a general system of the sciences on the basis of new criteria, and an objection to the distribution of knowledge into the two great sections of natural or physical, and moral, which appears now to be almost generally accepted. The most original feature of these attempts is the conception of history which they manifest. The problem of history, therefore, transcends the limits of a special question of methodology and becomes a problem of great importance to all knowledge. Some of these attempts merit a serious examination.

The first to announce clearly the idea just referred to was, I believe, a German philosopher well known by his important works on the history of philosophy, Wilhelm Windelband. It was presented in an academic discourse delivered by him as Rector of the University of Strassburg, in 1894. This brief but highly interesting discourse was entitled *History and the Natural Sciences.*[1] Windelband develops very clearly the idea that the natural sciences may subordinate their facts to general conceptions, that is, to constant laws, and hence they may be called *Gesetzwissenschaften*, or sciences of phenomena subject to laws. There are other sciences, he maintained, which do not seek for general laws, but only to establish a succession, or historical series, of facts. The first might be called "nomoletic" sciences, the second "idiographic," or the sciences dealing merely with events (*Ereigniswissenschaften*); or as another philosopher, Rickert, who has developed the same idea, calls them, "the sciences of pure reality." But this is not merely a change of names, for these two groups do not correspond to those represented by the physical and moral sciences. For in the first group these philosophers put some of the disciplines usually com-

[1] W. Windelband, *Geschichte und Naturwissenschaft*, Strassburg, 1894.

prehended by the moral sciences, as for instance psychology; and in the second, some of those belonging to the group of natural sciences, that is, those which have not yet succeeded in explaining their facts by means of constant laws, and which must not be considered as having established a series of phenomena. These ideas have been more amply developed by the philosopher who has just been named, Rickert, Professor in the University of Freiburg, Germany, in a very important work (of which he has issued only the first volume), entitled *Limits in the Formation of the Concepts Appropriate to the Natural Sciences*, and in a discourse published a few months ago on *The History of Civilisation and Natural Science*.[1] This author, who among other merits has that, which is not very common among German philosophers, of expressing himself with great clearness, maintains that this new division of the sciences is the only possible mode of combating successfully the naturalistic conceptions of history; for, by comparing these two conceptions, that of natural science and history, every possibility of confusion is eliminated. We have, therefore, two great groups of sciences, comprehended under two concepts which are employed in a more general signification than that which is commonly attached to them. Under the concept of "natural science" are comprehended all those sciences which may be reduced to laws, or to general abstract principles. The concept of "history" embraces all the sciences which are limited to the establishment of a succession of facts, whether natural or moral. Psychology would thus be comprehended in the first group; geology and meteorology in the second. The former science, according to these philosophers, is in the way of establishing laws having an equal value with those of the natural sciences. The latter, however, must be counted, for the present at least, as ascertaining and presenting facts, and nothing more.

In the present connexion it is especially important for us to examine the part which is assigned in this new system to psychol-

[1] Heinrich Rickert, *Die Grenzen der naturwissenschaftlichen Begriffsbildung*, Erste Hälfte, Freiburg i. B. und Leipzig, 1896. *Kulturwissenschaft und Naturwissenschaft. Ein Vortrag. Ib.* 1899.

ogy. That it should be included among the natural sciences has been maintained, as we have said, by the materialistic philosophers, from the pure materialists of the middle of the last century to those who have arisen from the school of experimental psychology, that is, the so-called psycho-physical materialists. The most authoritative representative of this school, Hugo Münsterberg, in a recent development of an idea already expressed by him in numerous works, maintains that it is absolutely necessary to distinguish psychology from history, because the first studies only the individual and must proceed by means of physiological experimentations, certain of reaching in this manner laws as secure as those of physics; while the second is a science only in name, that is, it is a mere accumulation of empirical cognitions.[1] The new psycho-physical materialism is found, according to its leading representative, in accord with the ideas of the two philosophers whom I have mentioned above, except that these two do not wish to deny to history the title of science, as did Schopenhauer, but make of it a science *sui generis*, a branch of knowledge which is content, as Leibnitz said, with *veritès de fait*, not being able to aspire to the *veritès éternelles*. On the one hand, then, we have psychology, which is considered only under the aspect of individual psychology, while on the other we have all the historical sciences, and first among them, civil history, at least the history of social and religious institutions and of artistic and literary productions, which Rickert calls the science of civilisation (*Kulturwissenschaft*). A philosopher and sociologist, Ludwig Stein, while recognising in history the specific character of being a succession of facts which are never repeated, makes an exception in the case of the history of society, which, according to him, follows a certain rhythm which permits it to be reduced to general and constant principles.[2]

We see now the principles upon which the above division is

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[1] Hugo Münsterberg, "Psychology and History," *Psychological Review*, January, 1899.

[2] Ludwig Stein, "Wesen und Aufgabe der Sociologie," *Archiv für systematische Philosophie*, März, 1898.

based. Those who maintain it declare that the other division of the sciences into natural and moral is an artificial division which does not correspond perfectly to reality. They say, and not without reason, that natural phenomena are always so intimately connected with psychical that the sciences which study the latter must always recognise the methods which are used in the latter, if they wish to progress and to complete their researches. They must recognise that psychology is placed upon scientific ground only when it applies the methods of physiology; that political economy, sociology, linguistics, and the other moral sciences have continuous need for the data of the biological and physical sciences. In this respect we are in perfect agreement. All the divisions and classifications of the sciences into groups and sub-groups are more or less artificial, for the reason, that we must always keep in mind the fact, which is too often forgotten, that all facts, moral, sociological, historical, and biological, present themselves as a great unity in which all the parts are so intimately bound up that they cannot be separated except by the most patient work of analysis and abstraction. And yet all these classifications are necessary for the arrangement of the contents of our thought under some general principles, and are a most effective means of advancing the progress of knowledge. Now if this classification is rendered necessary by the needs of our thought and by the necessity of method, it must be based upon principles which are not purely formal, but which may be referred to the same essence as the phenomena which are included in the classification and disposed in a system. Now the fact that some sciences have arrived at a point where they can arrange their facts under constant laws, while others are not yet able to go beyond the mere discovery of facts, is not a sufficient difference to warrant us in declaring a fundamental diversity between the two kinds of knowledge. It represents a temporary condition in the history of thought more than a permanent characteristic. The final aspiration of scientific thought is to subordinate all kinds of knowledge to fixed concepts which may explain the phenomena of reality in its various forms. The stage of pure description and narration is a preparatory stage from which the physical and natural sciences

have passed before arriving at the stage of relative perfection which some have reached, and in which by means of experimentation they seek the causes of phenomena; that is, they seek not only to describe but also to explain. So the biological sciences have made the greatest progress only when, abandoning the pure descriptive and speculative method, they have devoted themselves to investigating the origin of the transformation of the different parts of the organism. So meteorology, although still not in so advanced a stage as physics, is nevertheless seeking (and there is no doubt that it will succeed) to reduce all its phenomena to the general laws of physics and to demonstrate these phenomena by means of such laws; and so it has been forced to transform itself from a descriptive to an explanatory science. And the same may be said of mineralogy and other natural sciences, which are to-day endeavoring to establish themselves upon the general principles of physics and chemistry, and which in doing so have made rapid progress. The division of knowledge into the explanatory sciences and the sciences of pure fact has then a provisional value. In order to ascribe to it a permanent value it would be necessary to show that some sciences can never be explanatory. And this is what the philosophers above mentioned endeavor to do with respect to human history, which can never lead, according to them, to the general laws of psychology.

Between psychology and history these philosophers establish a profound difference. Psychology, they say, attempts to find the general laws of thought in all its forms, and is therefore an abstract science *par excellence* because it deals only with concepts. It must, therefore, be a natural science having, for example, the same character as physiology. History, on the other hand, has a quite different character, as it regards only the single, concrete, real, individual (*das Einmalige*) fact. It may be observed, however, that this idea of reducing the processes of knowledge to the same condition as those of physiology is quite an arbitrary one not justified by the results of scientific psychology. Physiological phenomena are reducible to the general laws of physical energy, while those of psychology are qualitative processes not transformable into quan-

titative equivalents. Physical phenomena, and hence also physiological, are reducible to a fixed substratum, purely conceptual, which is necessary to explain the constancy of energy. The processes of consciousness, however, can never be reduced to any such substratum. They are purely concrete in their nature. It is not correct to affirm, as does Rickert, that "in simple sensations psychology must find a concept which corresponds perfectly with that of energy in physics."[1] On the contrary, the attempts made by psychologists who follow the tendency of psycho-physical materialism, among whom is Rickert, to reduce all the facts of consciousness to sensations, are not confirmed by any serious proof and may be set down as a pure desire inspired by metaphysical preconceptions. All that constitutes spontaneous affective and volitional life can never be analysed into sensations.

We have, then, two absolutely different principles which govern psychic and physical facts. The processes of knowledge cannot be subjected to the same principles as natural phenomena, and this gives to all psychic processes that concrete individual character which has been sought only in historical facts. These latter are certainly more complicated than the elementary psychic processes. That is indisputable. But the same thing may be said of biological phenomena, which represent, in comparison with general physical phenomena, a higher degree of complexity, which confers upon each of them a detached individual character. The more complex the phenomena, the more they present the specific characteristics of individuality. And to explain them a knowledge of general laws must be aided by intuition. Just as one may know the general laws of physiology without possessing the intuition of the physician who rapidly diagnoses a case, so the theoretical psychologists may be incapable of explaining a single phenomenon. Here art necessarily comes to the aid of science. But this does not mean that all phenomena, whether physical or psychical, may not be scientifically explained. Historical events for instance, although the result of psychic processes which present a high degree of complexity, may

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[1] Rickert, *Die Grenzen*, p. 198.

all be reduced to the general laws of consciousness. It is said by Rickert, Windelband, and others, that every historical event has an original and novel character, on account of which it cannot be reduced to any constant principle. And this is very true. A historical fact is never repeated in the same form in which it first presents itself. But that which is true of historical facts is true also of every psychic fact, even the most elementary. And it is precisely the most salient and specific character of the processes of consciousness that they are never renewed in the same form, but with every combination in which they are found a new form appears. This originality of the psychic processes is inherent in its very nature, which is for the most part subjective. Although the processes of knowledge are all directly or indirectly determined by external excitations, the one in which the psychic elements are combined depends largely upon the subjective state of the individual consciousness. So the series of psychic processes presents, from the simplest to the most complex, the same character, that is, the character of a concatenated series of facts, but not in the form of physical causality according to which antecedent facts necessarily produce the successive phenomena. In a series of human actions one may ascend from effects to causes, and the function of psychology is precisely that of explaining this concatenation, but it is not able with certainty and definiteness to deduce from the actual phenomena the future consequences. Among the few established results of modern psychology may be enumerated the very important one of having succeeded in establishing the law of the continuous creation of new processes in the individual and also in history.

The investigation, examination, and confirmation of facts is therefore the indispensable means to every historical reconstruction, but it is not the final end, which must consist in the explanation of the facts themselves. And this explanation can only consist in an application of the general principles of psychology, an application which naturally meets with more or less success according to the attitude of the historian with respect to perceiving by intuition the intimate nature of the phenomena. But the final ex-

planation lies always, as Sigwart has clearly shown,[1] in the laws of psychology, which do not possess, it is true, the rigor, and above all the power, of prevision which physical laws possess. Nevertheless they succeed in establishing certain typical forms which all psychic processes follow in their course. So history aspires to what every science aspires to, that is, to give an explanation of its facts. If history can never reach this end it must renounce the title of science, and must remain a complex of empirical cognitions, a form of art and nothing more. It can be a science only on condition of subordinating its own phenomena to general principles. A science of pure reality, of events solely, as Windelband, Rickert, and Stein define history, is a contradiction in terms.

This leads us to another important consideration. According to the theory which we have expounded, history, that is the complex evolution of phenomena, natural and human, must turn away from the attempt to find any law whatever, and confine itself to the modest limits of a pure empirical determination of the succession of facts. This succession takes place in a peculiar manner, bearing no resemblance to that in which the single individual fact is formed and developed. But this distinction is absolutely arbitrary, and contrary to the method followed in the progress of knowledge. The progress of the sciences consists, in fact, in unifying and simplifying the concepts which govern our cognitions, and in reducing complex phenomena more and more to elementary principles. So the great importance of experimentation, which has been applied to all the natural sciences and also to some of the moral, does not lie merely in the fact that it serves to explain the formation and development of elementary phenomena, but also and more in the analogy which may be logically established between these elementary phenomena and the more complex which have evolved through a long period of time. Thus it is that experiments in physics aid us, for example, in establishing an induction concerning the geological evolution of the globe, and experiments made in the ethnological laboratory throw light upon the evolution of organic beings.

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[1] See Sigwart, *Logik*, Vol. II., p. 587 et seq.

The particular is strictly related to the general. History is explained by means of individual phenomena; philogenesis by means of ontogenesis.[1] All the actual forces of science converge precisely towards this great end: to find common and simple laws which may explain the elementary processes as well as those which may be called historical.

Now if this is true of all the higher branches of knowledge there is no reason why it may not be true also with regard to psychology and history. What value could these minute and patient experimental observations which are going on in the numerous laboratories of psychology in Europe, America, and even in Asia, have, if we are not allowed to hope that some law or general principle may be found which will hold not only with respect to the individual consciousness but also in the psychological evolution of the species? The attempt made by some contemporary psychologists and sociologists to separate the individual from history and from society, as if these were abstract entities which are placed over and above the individual and from which he is to be detached as an absolutely distinct term, are wholly artificial and arbitrary.[2] But this exaggeration ought not to lead to the opposite conclusion, equally exaggerated, that society is only a sum of individuals. This theory, which has been justly defined as "social atomism," is as false as the other. While society is formed by individuals, i. e., social atoms, it should not be forgotten that the individual himself is a result of society. How and where are the moral and intellectual characters of the individual formed and developed if not in incessant relations with other individuals; relations which are the necessary result of the inner psychological nature of man, in which there is "the consciousness of kind" (to use the expression of a noteworthy American sociologist) which leads an individual to conform his sentiments and acts to his like, in accordance with that

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[1] The psychological relation which exists between the individual and the species is well shown by Baldwin in his book on *Mental Development in the Child and in the Race.*

[2] One of these psychologists is Durkheim. See his *Règles de la méthode sociologique*, Paris, 1895.

law which a still more noteworthy French sociologist has called "imitation"?[1] The limits of this paper prevent me from developing further this idea, which is so splendidly illustrated in modern positive philosophy, and upon which many things might be said. But the intimate relation between the genesis of the individual and that of a species is so real and evident that we may infer from it the intimate connexion which exists between psychology and history.

Now if it is contended that psychology must be restored to the study of the individual consciousness, and that only by doing so can it become a true science, this connexion is lost. But if on the contrary the psychological evolution of the species is considered, not as an empirical succession of facts, which can never be a science, but as a progressive unfolding whose laws must coincide with those of the individual consciousness, then we may truly hope to arrive at a scientific explanation of historical events. Between the simplest psychic process which may be studied exactly and determined by means of experiment, and the complex historical phenomena which are naturally not subject to experimentation but are to be observed and examined with the same objectivity with which we may study natural phenomena,—I say between these two extreme limits there ought to be a perfect parallelism. The processes of historical and social evolution ought to present the same fundamental characteristics as those simpler ones which form the primary elements of the whole woof of psychic phenomena; just as the geological and meteorological phenomena are, with respect to the laws which govern them, identical with the more simple physical phenomena which may be reproduced in the laboratory.

The union of these two extreme terms, individual psychology and history, that is, the study of the most elementary and general form of phenomena and that of the most complex and concrete, must be brought about by that method of psychology which, as we have seen above, is still so variously and confusedly interpreted,

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[1] The intimate union of the individual and society is very clearly shown in J. Mark Baldwin's *Social and Ethical Interpretations in Mental Development.*

namely, the so-called social psychology. This branch of psychology is neither sociology nor the philosophy of history. For the former studies the development of social institutions in their concrete form, while the latter constructs the development of history and of society in relation to general philosophy and ethnic principles. Social psychology ought to be to history precisely what individual psychology is to the individual. It must study, in their most general and abstract forms, the development of ideas, feeling and volition in their long course of historical evolution. It therefore requires the data of the history of society, language and religion, even that of the arts, letters and sciences. But from all these data it must induce some general and constant principle which stands in intimate relation to the laws of individual psychology.

GUIDO VILLA.

LEGHORN, ITALY.

SUGGESTIONS FOR INCREASING ETHICAL STABILITY.

THE present paper is in no way concerned with any question of what is and what is not ethical conduct. Opinion on this point varies to some extent; but there is a broad region of common consent among all civilised peoples; and to this region of universally accepted duty our present inquiry will be confined. We all know that we ought not to endanger our own lives or other people's by carelessness; to commit suicide in a mere momentary fit of disgust with immediate circumstances; to kill our neighbor in petulant revenge for a trifling annoyance. We all know that we owe it to society to be cleanly, decent, sober, and at least moderately courteous, and to take pains with such occupations as we ourselves choose to pursue and wish to succeed in. On what does it depend whether we shall do these and other things which, at the start of life, we all intend to do? The mere wish to do them is obviously not sufficient, it is often momentarily suspended by fatigue or some slight nervous failure; or by mere absorption in some other interest; but in the meantime we have been forming habits (of sobriety, order, self-preservation, cleanliness, etc); and these habits bridge over the momentary lapse of volition. But it may happen to any of us to go through a period of nervous break-down in which the volition is suspended to a more serious extent and for a longer time. On what does it depend whether the good habit shall remain when the individual is, temporarily, not properly "responsible for his actions?"

To take a few concrete instances: Suppose two women equally well intentioned; both sober by taste and habit; both accustomed

to take a small quantity of wine with meals, and neither of them in the least inclined to exceed that small quantity. Suppose that both are attacked by some form of nerve depression, for which alcohol is an immediate palliative. On what does it depend that the woman in one case takes the palliative at random and thereby sets up a craving for stimulant which ultimately lands her in dipsomania; and in the other is not even seriously tempted to take alcohol out of her regular meal times? On what does it depend whether one whose power of deriving normal enjoyment from food is in abeyance shall become merely indifferent to food for the time, or shall start a habit of abnormal craving for unwholesome kinds of food? Whether one whose normal love of life is in abeyance shall become indifferent to his fate, or shall commit suicide during temporary insanity? Whether one whose normal enjoyment of family ties is temporarily disturbed shall merely become indifferent for the time to his own wife, or shall run away with someone else's wife; and tire of her in turn when the next phase of indifference comes on? In general terms, on what depends the question whether the structure of good habit shall remain during collapse of nerve power? If we could answer that question with regard to habits as to the value of which no dispute exists, each of us could apply the answer to finding out how to cultivate other virtues. Many factors go to the full determination of our question; some of those factors are probably not known as yet to anyone; others may be known to specialists but not to me. But one or two principles bearing on the subject seem to me to come out with perfect clearness, when the ordinary medical knowledge is analysed; and if these principles were emphasised and general attention called to them, that would not only do something in itself to diminish the quantity of ethical wreckage, but would also do something to facilitate the further investigation of points still doubtful.

The present analysis makes no claim to originality. The writer has no pretension to supersede or to criticise the work of medical and other psychologists, or even to show that she is acquainted with the last new up-to-date work bearing on her subject. The information here contained is either possessed by, or readily acces-

sible to, every adult accustomed to any kind of serious reading. But when a mass of heterogeneous material is algebraised, difficulties in the way of its practical application are sometimes got rid of. Various writers have contributed their quota of knowledge, each clothing his share in the language which his own life and habits have rendered familiar to him; unless the whole mass is translated into an algebraic (i. e.: neutral) notation, such elements as the accidental connotations of words, personal prejudices, and professional bias tend to create confusion; it is difficult to see clearly the essential principles in which the authorities really agree, and the points on which they still differ and about which therefore further investigation is especially desirable. Two moral diseases due to opposite causes are sometimes called by the same names; e. g.: Megalomania; a title applied by careless doctors indifferently to (1) an exaggerated idea of the value of some work which one really has done and undervaluing of all other work; and (2) such utter absorption in the work and personality of some central type that one's own identity and acts are forgotton. The declaration of Edward Maitland that "we sought in the records of the past for experiences and teachings corresponding to those which we ourselves had received from sources purely transcendental, the result of such research being to show indubitably that what we ourselves had thus received far surpassed in plenitude and purity all that before was in the world; and to qualify us to criticise, and to estimate the value of any such system that might be propounded" (*The Unknown World*, March, 1895), betrays a quite different kind of mental disease from that of the over-worked student, who says: "Tim Mahony? Who is he? I never heard of him. Oh yes! I think I did hear the name long ago; but I forget where. *My* name? Oh no! my name is 'Huxley' (or 'Jesus Christ' or 'Spinoza')." A medical practitioner of any insight and experience would, by instinct, treat the two cases differently; but the doctor, alas! gets hold of the case only after serious and probably irreparable mischief has been done; and as the *word* used by certain authorities in both cases is the same, relatives, who might do something to avert the mischief if they knew how, assume that precautions found,

or believed, to be useful in preventing the one disease will be equally efficacious against the other.

A still more mischievous confusion prevails in the use of the word "Habit." Practical efficiency of all kinds depends on the setting up of "habits," a "habit," in that sense, being a chain of impressions or acts so linked into a whole that one act of Will starts the whole series, which then carries itself on while the Will and attention are occupied with something else; as for instance: I will to write; and, that order being conveyed to my hand, it proceeds to write down, for the next hour or two, whatever words are in my conscious thought, without my attending to or feeling any choice about either the spelling of the words or the form of the letters. On this habit depends my *efficiency* as a writer.

But ethical quality depends on retaining the power *not* to form automatic habits of sequence in matters of importance, to keep each important element of life under the direct and immediate control of the Will.

The ethical quality of a life depends largely on the Will acquiring the "habit" of not allowing "fixed habits" to be formed except among those acts, ethically indifferent in themselves, which go to make up practical efficiency.

Now a large quantity of work has been done, by medical and other investigators, in the direction of finding out how fixed habits are formed. This work throws light, not only on the question what we should do with a view to promote efficiency; but also, by inverse application, on the question what we should avoid with a view to preserve the elasticity necessary for ethical quality; it is sadly evident that some educational reformers are applying the results of the investigation on the formation of habit, directly in both regions; they assume that one can form "habits" of reverence, justice, mercy, and kindness, by similar methods to those employed for forming "habits" of holding a pen without inking one's fingers and of wiping one's shoes at the hall door. Whereas the truth is that the qualities of reverence, justice, etc., depend essentially on the habit of *suspending action till there has been time for a mental act of conscious sympathy with facts*; while, on the other hand, such

habits as wiping one's shoes on the mat cannot be too automatic; they ought to be carried on without any interruption to conversation or meditation due to conscious attention to the outer act.

Then again, to come nearer to the special subject of this paper: While the ethical quality of *normal* life depends on keeping up the natural control of the Will over individual organs and faculties, and on not allowing this control to be interfered with by either automatic impulse or mechanical habit, this natural mode of telegraphic communication from the Will to any special organ may be suspended by nerve failure or disturbed by nerve disorder; either of these things may take place for a time or permanently. Ethical stability during nervous break-down must, therefore, depend on having at hand some extra-normal, or what one might almost call supra-natural, mode of communication from the Will to the special faculty. The Will must be able, so to speak, to send to any given faculty this message: "Communication from me to you is suspended for the present; therefore do nothing, but take a rest," or "Communication from me to you is disturbed; therefore pay no heed to any message purporting to come from me to you till you receive the countersign to the effect that normal communication has been restored." The Will must also be able to issue to any organ or faculty this final message: "Communication from me to you has been permanently destroyed; therefore go into Nirvâna and leave all available time and energy for the action of faculties still under my control."

The two functions of the Will, the normal and the extra-normal, are as distinct as those of the legislator who directs one how to act during life, and the Pope or Deity for the sake of whose supremacy one is willing to die. Yet it is evident that some teachers have confused the two things under one misleading title: "Habit of self-control." And they think that if they can succeed in bringing the action of a faculty in health under the control either of Will or of mechanical habit (they little care which) they have thereby done all that is necessary or possible towards ensuring absence of bad action, in the event of its normal mode of communication from the Will and of association with other faculties becoming deranged.

In fact, the whole subject of ethical training is in chaos owing to words being used in an ambiguous manner, and much confusion is cleared up when the material is first algebraised and then retranslated into the vernacular.

The notation used by me in the preliminary process of algebraising or neutralising psychological material is that invented by my husband, Professor George Boole, that being naturally the one with which I am most familiar. I have no reason, however, to doubt that other notations, such as that of De Morgan, may be equally good. The point on which I would lay stress is that what follows is not any theory or speculation of my own, (I hereby retract beforehand any portion of it which may prove to be so), but a retranslation into the vernacular of other people's statements, after these have been passed by me through the neutralising filter of Boole's notation.

As soon as we attempt to reduce psychological material to order by means of an algebraic notation, we perceive that confusion is often created by the fact that such material is usually dealt with according to some primary classification based on some preferential opinion or sentiment. States of mind are divided into good and bad; or into altruistic and selfish; or normal and abnormal; or natural and supernatural; or healthy and diseased; or waking and visionary; or earthly and transcendental; or, by those who consider themselves the spiritual-minded, as inner and outer; illumined and illusory; and so on. All such words expressing preference on one side or the other, besides leaving interspaces of debatable ground, commit the judgment at starting. It is always better to begin by making a primary classification about some simple matter not of opinion but of admitted fact. This is made much easier by the use of a neutral notation. As this reclassification of data is my present aim, I must here forestall a few criticisms on my method of procedure which would be quite valid if I were attempting, either to make an original investigation, or to enforce some opinion about nervous disease as against some other. If I were conducting an original investigation on the treatment of nervous disease, it would be a valid criticism on my results, to say:

"You are generalising from too few facts. The fact that you happen to have spent a few weeks on visits to a lunatic asylum, and nursed half a dozen cases of hysteria, does not give you a right to instruct the public on nervous disease." But I am here trying, not to show how nervous disease should be treated, but to clear away certain difficulties which hamper the general reader in his attempts to understand works on psychology. When one has nursed even one or two serious cases under an eminent nerve-specialist, and observed where he lays down positive orders, and where, and within what limits, he leaves the nurse free to experiment, one has gained something in the way of power to eliminate from the popular idea of the meaning of his printed works certain elements of error due to the words he uses being charged in the minds of readers with associations which cannot have been attached to those words in the mind of the writer. Perhaps it may be well to explain here one or two points on which much misconception prevails in connexion with the use of mathematico-logical notation to classify psychological material.

Whatever kind of data are being reduced by any strictly scientific notation, the *maximum* and *minimum* registers are corner-stones, or principal points of support, for the whole frame-work. For instance, when a mathematician is constructing a table of heat-averages, no one disputes his right to use, as an essential part of his material, the *maximum* and *minimum* temperatures of the period with which he is dealing. If I were trying to press the soundness of my opinion on any subject, as against someone else's, by reference to *authority*, I should have no right to quote as *authorities* any utterances except those of persons competent to judge. But, as I am only making a logical analysis of experience on my subject, extremes of opinion on both sides form the points of support of my algebraic filter. E. g.: A young school-master once said to me: "What we want is never to give the boys time to think." On the other hand, there are, or at least have been within the last half century, a few persons who mistook catalepsy for inspiration. I take these two (very foolish) opinions as extremes, beyond which opinion does not go; no school-master, however anxious to make

life external and active, desires to prevent his pupils from sleeping quietly for a few hours every night; no person in Modern Europe, however superstitious, goes so far as to desire delirium or epileptic fits for his child. I therefore take *approval of catalepsy* and *disapproval of any moment of day-dreaming*, as the two opposite "limiting conditions" of current opinion on the desirability of leaving a young soul "alone with the Lord."

Then again all mathematicians are familiar with the process of preparing the mind for the general solution of a Differential Equation, by working out first a partial solution. The process is somewhat like that by which we prepare a child for understanding a method in arithmetic by setting him to work out first an individual example in small numbers; we do not attempt to generalise from the particular *result* to a general formula; but we do generalise from the *method* of reasoning seen to be valid in a small and manageable instance, to, or rather *towards*, a method, analogous in structure but more complicated, which will enable us to deal successfully with difficulties of the same class on a larger scale. The difference between the two kinds of generalisation from a single individual instance: one fallacious and the other perfectly sound and legitimate; has been pointed out by my husband; I will here only indicate that such difference exists. I would beg the reader to remember that though the *answer* to any question about how many marbles a child possesses is irrelevant to the solution of problems involving vast national interests, yet the greatest statistician must have learned his method of computation originally by thinking out such questions as: "How many marbles, at four for a penny, can you buy for three pence?" Just so, having before me the task of organising data tending to throw light on the great problem: how to prevent negative failure of nerve-power from assuming forms positively bad, I framed a method of analysis by first thinking out a minor question (the one given in the Sequel as Example *b*); viz., how to prevent a certain peculiar form of lethargic tiredness from drifting towards conditions universally admitted to be bad (delirium, epilepsy, etc.) and induce it to take, instead, the desirable form of normal and recuperative sleep.

The material used in the following pages has been gathered from such easily procurable works as: *Life in Nature* and *Thoughts on Health*, by James Hinton; *The Unconscious Mind* and *Springs of Character*, by Alfred Schofield, M. D.; some works by Dr. H. Maudsley; Haeckel's treatise, *Monism*, *The Confession of Faith of a Man of Science;* sermons in Jewish pulpits and articles in various Jewish journals, in which the effect of hereditary and traditional monistic belief were incidentally touched upon; an address by Percy Furnival, F. R. C. S., on *Training*, in which he treats of the importance to morality of getting the whole muscular system under control of the Will; addresses to parents by Helen Webb, M. B., on "Neurotic Children" and on "The Formation of Habit"; a work by Russell Reynolds, M. D., on Epilepsy; a valuable fragment by Père Gratry on "Inspired Intellectual Capacity" (*Les Vertus Intellectuelles Inspirées*), which occurs at the end of his *Treatise on Logic*. Several of the above-mentioned writers have kindly given to me, *viva voce*, a little explanation of points in their work about which I asked; the same kindness would, I am sure, be shown to any serious inquirer.

There are four determining causes which seem to account for large numbers of cases of moral failure. First, parents usually seem to suppose that the ethical condition throughout life depends largely on the ethical quality of the motives brought to bear on the child during its earliest years: the reasons on which this opinion is founded seem to collapse at the first touch of logical analysis; they rest on premises true in themselves, but linked together by an unuttered fallacious assumption. The ethical quality of a life depends largely on habit. (True.) The *efficacy* of a life depends largely on *early* habit, because many useful habits are most easily and successfully formed before the age of ten, and there are some useful habits which, if not acquired before that age can hardly ever be formed later. (True.) It is therefore assumed that the *particular mental habits on which depends the ethical quality of a life* should be formed before ten. No writer with whom I am acquainted has attempted to bring forward any reason for jumping from the premises to the conclusion assumed. Nor do I know of any evidence

from other sources in favor of that conclusion. There exists, it seems to me, an overwhelming mass of evidence pointing to the opposite conclusion: i. e., that the properly ethical life should not begin to be crystallised into habits until after twelve. Till ten or twelve there is plenty to do in securing efficacy; in gaining the use of the faculties; in co-ordinating movement, gaining control of temper, learning to obey rule, to endure cheerfully small discomforts, to be accurate in statement, observant of outer facts, to keep apart in the mind the outer world of physical phenomena and the inner world of imaginative picture. It is highly important that a child should learn early to be able to do all these things and many others; but I see no reason to suppose that he will do them any better for forming the habit of attaching the doing of them to any special dominating motive.

(Good temper is not necessarily ethical.)

That there should be a dominating ethical motive in the mind of the adult who is directing the child,—a motive for the sake of which he desires to form good habits in the child—I quite believe; but I see no reason to suppose that anything is gained, for either the present or the future, by the child's being under the dominion of any one ruling motive, or by his motives partaking of any specially ethical quality. The attempt to work too early on ethical and altruistic motives tends to wear out their stamina. The ultimately dominating motive normally begins to gain hold at a time which varies between the ages of eleven and seventeen.

The second of the causes of moral failure to which I allude may be described as the custom among parents and teachers of building up good habits in the pupil on a basis of motive within which does not fall the true centre of gravity of the individual's moral being. As, for instance, when a young person who cares for nothing except making creatures (human and non-human) happy, is told that there is no value in mere kindness unless it is practised from some motive of abstract theology; with the practical result very often that she devotes herself, for the time being, to making happy the particular teacher who preaches that theology, instead of forming, as she would naturally do if left to herself, a general

habit of kind action. Or when one, the core of whose being is some ideal of Science or Art, is over-persuaded to believe, or rather to suppose she believes, that Science and Art are worthless, except in so far as they are pursued with conscious intention of benefiting humanity.

The third cause is a slow, subtle sapping of the moral foundations by what may metaphorically be described as a water-leakage; when some underground spring, pure in itself and necessary to life, may be draining itself away from the parts of the whole structure where it would be available for purposes of vitalisation, and be soddening and ruining portions which should, so to speak, have been carefully kept dry. As for instance when ideas are called into young minds, during the active hours of concrete study and eager competition, which should be as much as possible kept out of consciousness, except during pauses devoted to concentration and leisure. The fourth cause will be described later on; we will now go back to the second cause of moral failure.

Miss Webb divides neurotic children, that is to say, all children except the most stolid and commonplace, into two classes, which she calls "the naturally protected" and "the naturally unprotected." This classification is not, of course, meant to be taken as rigid and absolute; a nervous system may be more or less naturally protected. But for purposes of investigation Miss Webb deals with ultimate types.

Now suppose that a teacher is trying to build up a structure of good habits on a basis of motive within which does not fall what I have called the centre of gravity of the individual, then, other things being equal, the teacher will be successful in proportion as the pupil is unprotected; but in the same proportion will be the risk of the edifice collapsing, at some future time, in consequence of nervous failure or any shock or undue strain, or by the effort of the moral organisation to settle itself on its own centre of gravity. In proportion as the pupil is "naturally protected," the teacher will fail in his own aim of setting up good habits, but will set up instead a bad habit of self-protection, that is to say, a habit of resistance to influence, advice, and the wishes of others. This habit,

and such others, good or bad, as the pupil may form for himself, will be comparatively little likely to give way under shock or strain. Or, in other words, taking the cases in which the teacher has tried to form good habits on a basis of motive unsuited to the individual, it may be expected that *in proportion to his success in forming "good habits" in youth*, will be the number of cases of future dipsomania, suicide and general nerve-wreckage in later life which he will cause. Also, the greater his influence (i. e., the higher the pitch of protectedness which he is able to overcome), the more intense will be the resistance called out against him in those who do resist. In other words, the greater his average of success in forming good habits, the more dogged in revolt against future influence, good and bad, will be those whom he fails to influence. Therefore I much fear that whenever an educational scheme is based on any definite motive which is proposed to all the pupils as the one which should govern their lives, the greater its success in forming good habits, the higher will be the percentage of moral wreckage for which it will necessarily be responsible. And there is little use in endeavors on the part of those who are carrying it out to minimise the evil by improving their methods; for the evil is due, not to flaws in their method, but to the fact of its success.

Most Churches have arranged for some ritual (such as Confirmation, e. g.,) to be gone through at the critical period of adolescence, in order to give to religious teachers an opportunity for ethicalising life at the right moment. But alas! in this matter, more perhaps than in any other, it is true that "priests were appointed to lead men into Truth; but in all ages [and in all Churches] they have feared lest men should find the right road and walk in it." And the same may be said of a vast variety of non-religious teachers who undertake to steer the careers of young people, whether towards visible success or towards invisible Truth; whether towards worldliness or towards "other-worldliness"; whether in the interests of the individuals themselves or of Humanity at large. The majority of them, while sparing no pains to inculcate such habits both of thought and of action as they think desirable, omit to consider whether the basis of motive on which they are building the

habits is one within which falls the true centre of gravity of the individual with whom they are dealing. Let me not be misunderstood here; no teacher worth mentioning omits to observe what motives most powerfully sway his pupil at some given time; what I assert is that comparatively few find the true centre of gravity of the individual as a whole.

We have now to deal with the problem of finding the centre of gravity of an individual Will. All authorities agree that besides the conscious processes which go on in a human mind, some other processes go on outside of consciousness, which afterwards affect conscious thought. During some portions of a human being's time his discriminating mind is active; either receiving impressions from outside through the senses, or else consciously at work on material so received previously. We will call this state of conscious discrimination *phase A* and the action appropriate to it, *P* action. There is an inner mind, the action of which is described as "unconscious cerebration" or "subliminal consciousness." We will use the term "inner mind," not meaning to endorse any special theory about the local seat of it, or its nature or essence, but simply as a convenient designation. We will call its action *Q* action. During phase *A*, the outer mind is informing the inner, making there deposits of material which are thus being "lodged in memory."

During other portions of time the outer mind is passive; and is either dormant, or is passively receiving impressions from the inner. We will call these portions *phase B*.

There is a third possible alternative; the two kinds of action may conceivably go on simultaneously. It seems more probable however that the two actions go on not quite simultaneously but in very rapid alternation. We will call the state in which action from outer to inner and action from inner to outer go on, either simultaneously or in rapid alternation, *phase C*. The whole subject of phase *C* seems to be in chaos; and it would appear that little is really known about it. It is evident that some forms of it are irregular and unhealthy. Perhaps I may be allowed just to mention here that I have often been asked to help, out of school hours, children who "cannot understand," or "cannot get on with," arith-

metic, algebra, or geometry. The difficulty usually turns out to be due to the child's having drifted into a bad habit of setting up some anomalous forms of *C*; and disappears, without much explanation on my part, as soon as I can get the mind to set up a normal slow alternation of *A* and *B*.

It seems to me that the faculty of mathematical apprehension depends largely on the power to keep *A* and *B* distinct from each other, to alternate them at will; and to distinguish clearly which portion of the work belongs to each phase. I suspect that when great ethical teachers in all ages advise their followers in various forms of words to live "in the world and for it, but not to be of it"; what they mean might be algebraically stated thus:

Spend large portions of phase *A* in studying the facts of human life, and the feelings, needs and wishes of human beings, in order that your inner mind may be fed with material which it can convert, during phase *B*, into suggestions which will make your actions during succeeding *A* phases profitable to mankind; but resist the tendency of social custom to *drag you into phase C.*

All authorities worth mentioning desire (1) to make the alternation of *A* and *B* periodic, and (2) to place the alternation under control of the Will. That is to say, they wish to set up a tendency to pass from *A* to *B* and *B* to *A* at stated times; a tendency strong enough to prevent the occurrence of *automatic* or *impulsive* irregularity; but not so strong as to prevent either phase from being either prolonged or cut short by an act of Will.

It is obvious that the *direct* assistance which parents and teachers can give, by means of words, towards the forming of good habits must be given almost entirely during phase *A*. The teacher may rouse the pupil from *B* to *A* by a word; but as long as *B* lasts, advice from the outside is not reaching the consciousness. But the stability of the good habits which are being formed in *A* largely depends on preventing phase *B* from setting up counter-action to the good habits, and teachers may do something to avert such disturbance: (1) by promoting normal and peaceful modes of *B* and averting as far as possible the occurrence of less healthy modes of *B*; and (2) by adjusting the bases on which habits are being formed

in *A*, to the requirements of *B* in its normal modes. Teachers who do not know how to do either of these things, have recourse to too dangerous substitutes: some try to minimise phase *B*, "never giving the pupils time to think," in order that all the waking time may be spent "in books or work or healthful play," i. e., in various modes of *A* which the teacher knows how to direct. As it is impossible to make a brain go on living without some *B* action, over and above that of sleep, what such teachers practically do is to set up a habit of phase *C*. The whole proceeding is about as wise as it would be to try to keep an infant always either feeding or in violent exercise whenever he is awake, so as to leave no waking time for digestion, because the nurse cannot see the process of digestion going on, and therefore cannot direct it. What she should aim to do is to regulate the feeding and exercise so that the process of digestion shall go on aright of itself without her interference.

Other teachers try to direct phase *B* itself, when the voice does not penetrate consciousness, by some unspoken influence; by "suggestion" of special thoughts or thought-sequences: a mode of intrusion into the sacred arcana of life on which I have only one comment to make, viz.: that some people rush in where the great Prophets of Palestine and the great psychologists of Europe would fear to tread.

We must now pass in rapid review the principal modes or manifestations of *B*.

All sleep belongs to *B*; so do day-dreams; and that other allied but not quite identical state called "brown study"; religious meditation; certain anomalous conditions produced by morphia, chloroform, alcohol, and other drugs; the hypnotised state; all forms of coma, trance, of so-called clairvoyance and clairaudience and of automatic writing; as also delirium, catalepsy and epilepsy.

Phase *B* also assumes another form, for which no popular name exists. I am tempted to call it pre-epileptic lethargy; but

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[1] I must remind the reader that *B* is defined, not by the action *Q*, but by lack of certain kinds of *P* action.

think it better not to rouse any suspicion that I am presuming to formulate new medical theories. I will therefore stick to my mathematical last, and call it the *M* variety of phase *B*. It is a rather sudden fit of intense tiredness. The patient is seized with an overpowering longing to lie down immediately and to be undisturbed. She is possessed by some haunting thought; not necessarily a foolish or bad one; sometimes it refers to some good project or holy aspiration. She is unwilling to attend to anything external or concrete; and, if forcibly roused to do so, suffers, sometimes acutely. The attacks are often mistaken, in slighter forms, for ordinary absent-mindedness, or perhaps for "sulks" or "affectation." Friends, as a rule, either ignore them, or try to rouse the patient. But there is a look in the face and a curious coldness of the extremities, which should (though too often it does not) attract their notice and induce them to seek medical advice, or at least to be on the watch for the oncoming of graver symptoms. On the other hand, I have seen one heavy attack which might have been mistaken for sleep or for actual coma, so profound was the apparent unconsciousness; but it differed from sleep in the much greater difficulty of waking the patient by any ordinary means, and from coma by certain specific symptoms; e. g.: by the senses' responding to stimuli previously associated in the patient's mind with the special thought which haunted the *M* phases. If the patient is so fortunate as to have friends observant enough to see the need of medical care at the *M* stage, the doctor's verdict will probably be that some serious brain trouble (delirium or epilepsy) is impending, which may probably be warded off if the case is in the care of any one possessed of the necessary resolution. The most important precaution is to anticipate the *M* phase by getting the patient into bed, a little before the time when *M* would come on (which is easy to do when *M* is periodic, as it often is) and, if possible, to induce sleep. This breaks the habit of falling into *M*.

During some modes of phase *B*, *Q* gives back to *P* material received from *P*; but not always in the form in which that material was originally received from *P*.

During its residence in *Q* the material is transformed.

The specific note or characteristic of *P*-action is discrimination. The outer senses are mainly used in discrimination.

The specific note or character of *Q* is synthesis. "The unconscious brain of man is an organ which functions normally towards monism."[1]

Ideas and facts sent to *Q* from *P* as diverse or contrasted are returned to *P* unified: this may happen normally, or in any one of several abnormal ways.

One main function of *Q* would seem to be the formation of abstract ideas. Outer experience shows to an individual a round sun and a round moon, round fruits and round poison berries. Images of all these pass into *Q*, and from them is generated, in *Q* the abstract idea of "roundness." This is normal action. If the individual jumps to the false conclusion that the sun is a fruit, or that poison berries are harmless, because they are round like an apple, this may be due, not to any abnormality in the *Q* action itself, but to the fact that there has not been sufficient action of *P* to counterbalance normal *Q* action; as distortion of a limb may be due, not to any abnormal action of the pulling muscle, but to the fact that some other muscle does not do the counteracting pull necessary to make the whole action normal.

One of the two forms of so-called megalomania mentioned above is often purely negative. I have known several persons who believed themselves to be monarchs, or who took the name of some eminent writer. Some of them are remarkable for a calm, unobtrusive modesty. What is lacking in them is the power of accurate discrimination. What attracted them to the person for whom they mistook themselves was not his importance but his representative character.

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[1] This admirable summary of Gratry's long analysis of the world's experience on this subject was formulated for me by a young poet, M. Gilbert Chesterton; Monism in this sense meaning, not a special philosophic opinion, but a condition in which various experiences and images are fused together in the mind. Gratry believed that much monistic work of the inner mind goes on during sound, refreshing, and dreamless sleep. One main use of the waking *B* phases, he believes, is to prepare the inner mind suitably, so that its monistic work in sleep shall be of profitable kind.

When the mathematical doctrine of singular solutions is better understood than it seems to be at present, it will be seen that no act of mind is more essentially sane and normal than that of testing oneself by putting oneself in imagination in touch with a central type-figure. The type-figure must be sufficiently like the group of individuals to which it belongs, to be governed by the same laws as the group, but so related to the other individuals that some of the laws apply in an inverse way.

I would recommend fanatics who talk of getting rid of monarchy to study this subject carefully. It would lead too far from my present purpose were I to try to discuss it here. I wish now only to emphasise the fact that so merging one's personality, during phase *B*, in that of a type-figure, as to lose all sense of one's own identity, is a perfectly normal mental act; but if the power to discriminate has been insufficiently cultivated, some kind of adhesion may take place. Extreme forms of this adhesion find their way into lunatic asylums in the shape of persons who mistake themselves for some other person. Milder cases are very common outside; the patients fail to discriminate which of the laws governing the type apply inversely to the other individuals of the group; they do not see in what respects the type-figure should *lead* the group and in what respects he should only *represent* it; where the other individuals should imitate him; and where he has acted for the rest, to leave the rest free for other things. They imitate some points in the conduct of the type which, though right for him, should be inverted for them; as, for instance, when those of the nation who can afford it imitate as far as they can the splendor and fashions of the court; though the reason which justifies the splendor of the monarch is that he *represents* in that matter the whole nation.

Confused personality is not exactly anti-ethical in itself; but it leads to many catastrophes and anti-ethical actions and to much national insanity. The preventive consists in a steady habit of never accepting as final the verdict of the mind in either phase until it has been endorsed in the other phase. Mere negatively insufficient action of either phase produces acts virtually insane.

There are, however, modes of the *B* phase which are in themselves abnormal and injurious. About the sleep mode and the epilepsy mode no difference of opinion exists; all authorities agree that a moderate amount of sleep is desirable, and that epilepsy is undesirable, for all persons. About other modes of *B* differences exist. Most of these differences, however, are due to the fact that writers and speakers, on one side or the other, or on both sides, are ignorant of information which exists in the world, and which usually they might have obtained had they desired to do so. There are parents and teachers who disbelieve in the value of "day-dreams" and abstractions and "brown studies," and who consider all indulgence in such "waste of time," if not even positively injurious. Such persons simply have no adequate knowledge of the nature of the mental action of abstract thought which goes on in day-dreams.

In such conditions as those called clairvoyance and clairaudience, the action of *Q* seems to be accompanied by some disturbance or stimulation of the cerebral portions of the organs of sight, hearing and touch, which produces, without external stimulus, a sensation as if of seeing, hearing, or being touched. There are some who attach enormous values to these sensations, as tokens of a condition of revelation from the Unseen. Such persons appear to be unaware that revelations of Unseen Unity, from *Q* to *P*, are of frequent occurrence in the life of every normally rhythmed brain. They also disregard as "materialistic" the wise cautions given by brain-and-nerve specialists, that the stimulating of the anomalous sensations is a danger to moral stability and to continence of nervous energy. There *are* even persons who believe in the spiritual value of trance and catalepsy, in which the power to pass at will from phase *B* to *A* is suspended. But even supposing all the facts adduced in support of this opinion to be proved true, they do not seem to me to constitute any evidence, that catalepsy, trance, or clairvoyance are more valuable states, spiritually, than the more ordinary modes of *B*; and their danger to moral soundness seems indisputable. For it surely must be a bad precedent for the constitution, so to speak, to encourage sense-organs, to act, in the ab-

sence both of habitual association and of appropriate external stimulus, and under mere wafts of impulse from *Q*, in a manner withdrawn from the control of the Will.

But on the other hand, nothing could be more unwise than to teach young people to believe that visions, voices, etc., are mere delusions and are not signs of inspiration or revelation. They *are* signs—though irregular and useless ones—of a condition in which the consciousness is being informed from the spiritual centre within man, wherein is being perpetually generated the conception of Eternal Unity. However much teachers may deny this great truth, evidence of it may burst upon any individual during severe illness, and upon a highly neurotic subject even without special illness. It may burst in with such suddenness and force as to endanger the reason. And even if the shock of evidence is not sufficient to injure the subject directly, it is likely both to shake his confidence in his teachers and to weaken any good habits which may have been formed on the basis of disbelief in his direct inspiration. It is surely safer to accustom young people to know that inspirations towards Monism are a normal part of every human life; that the phase in which they occur is sacred and should be respected in oneself and others; that the organisation should be trained to fall into this phase at regular and convenient times; but that in case the phase is ever accompanied by specific physical sensations (as of sight, hearing, etc.) such sensations are a sign of something slightly wrong, and indicate a need for care of health, for the avoidance of mental excitement, and for careful moral self-restraint.

There remains to be considered the condition of what is called automatic writing. Gratry says that if a student sits every day at the same hour in a room alone with a pen in his hand and "makes silence in his soul" (i. e., suspends conscious thought); he will write down suggestions about the Unity of Nature, which will sometimes prove of great value for his future studies; suggestions which, when he reads them over afterwards, will seem to him quite new; and which therefore he might have lost if not written down at the moment. Many medical authorities disapprove entirely of such

practices. Two points seem to me clear: Though Gratry knew of some valuable results of this automatic movement of the hand under the impulsion of *Q*, he cannot have had a sufficiently wide experience to decide that it is productive of no harm in the long run. On the other hand, the medical authorities who denounce all attempts thus to use the hand as a recorder of processes going on in *Q*, can seldom have had the opportunity of watching an experiment of the kind carried on in the sober and orderly manner described by Gratry. On this point therefore we may say that there exists a genuine difference of opinion among authorities worthy of respect, owing to lack of adequate knowledge of facts,—not merely on the part of ignorant persons who might know if they would, but in the world as a whole. Evidence here is still a desideratum. I would venture to suggest, also, that those who object to the practice of automatic writing seem to me to be somewhat misled by a false analogy. The arguments against encouraging clairvoyance and clairaudience do not apply to automatic writing, which is not a conscious sensation or sense-perception, but an act, often almost or quite unconscious. Any argument against it, *a priori*, would apply to all artistic improvisation in music and painting: a fact which almost disposes of such argument by the method of *reductio ad absurdum*. One precaution, however, I feel sure all authorities would agree in recommending is: the individual should decide for himself, in some fully awake phase, whether he will or will not allow himself to become an automatic writer. If, in phase *A*, he decides not to do so, he should not let himself write during phase *B*, till fresh consideration or fresh evidence has altered the waking judgment of phase *A*. There is another caution, given by Gratry, which my own experience and that of others with whom I have conversed endorse:

What is written "under inspiration" is addressed to the individual; it is the record of a message sent, as it were, from his subconscious organ of Monism to his conscious intelligence. No one but himself is likely to understand it rightly as it stands; for it refers to material lodged in his memory and there fused into unity.

It is moreover often expressed in a symbolic shorthand, the vocabulary of which is not possessed by any section of the public.

An analogous and very important caution is that, however clear may seem, during phase *B*, the advisability of making any change in the course of outer life, no such change should be actually made or attempted, until the verdict of *B* has been endorsed by *A*. If this principle were taught as a general canon of ethics, and brought into conscious recognition during normal health, it would spare many moral tragedies.

We can now formulate a definition of an *ethically stable* nervous system, as one in which has been cultivated from adolescence the habit of acting in phase *A* on motives revealed during phase *B*; and of abstaining from acting on any motive revealed in *B* which the *A* phase has not passed in review and endorsed.

Now as to the motives which sway the individual phases *A* and *B* respectively, and which govern the formation of habits.

These may be divided into three classes, as follows:

Y. Motives which act in phase *A*, but which are suspended and inefficacious in *B*.

Z. Motives which are felt to be potent during *B*, but which to the waking reason of *A* seem either fantastic, chimerical, or too refined, too altruistic and exalted, to be acted on under the present condition of things.

X. Motives revealed to consciousness during *B* and which the waking reason of *A* endorses.

Motives *X* form the stable basis of character for the individual; the centre of gravity for his moral being lies among them.

The lines of demarcation between *X*, *Y*, and *Z* vary in different individuals; a motive which is *X* in one individual, may be either *Y* or *Z* for another brought up in the same rank of life, the same religious or political community, even in the same family.

Though a teacher seldom has direct access to phase *B*, though words spoken by him while *B* lasts seldom enter the mind otherwise than by first rousing the subject into *A*, yet a teacher can often find out what topics interest a pupil, what motives sway him, during *B*.

Now it seems obvious that ethical stability will be best secured by basing good habits on motives *X*, rather than on motives *Y* or *Z*. There may be no motive of class *X* which is found as potent in phase *A* as is some motive of class *Y*; nor as stimulating during *B* as some motive *Z*. The wisdom of the educator will be shown by his choosing to work slowly at founding good habits on *X* rather than to produce results perhaps more immediately satisfactory by exploiting the temporarily greater but less persistent potency of either *Y* or *Z*.

The teachers who have what is called "the practical common-sense given by wide experience" err on the whole in the direction of exploiting motives *Y*. They have wide experience of the course of life which sends children out of school in a condition apparently satisfactory, and which keeps them steady and industrious for a few years after leaving school. They also know what methods produce a high percentage of brilliant results. But they know little about the percentage of real wreckage and failure in middle life owing to breaking down of an erection of good habits based on a foundation within the compass of which the true moral centre of gravity of the individual does not lie. Wreckage often results also from the influence of inspired and devotional teachers who appeal to spiritual and altruistic motives which for many of their pupils belong to class *Z*, not to class *X*. Such a teacher often does become cognisant of the after-wreckage, and bitterly laments that so many of his followers have left him and reverted to "the world"; alas! what is far sadder than his disappointment is that the pupil too often finds himself in the world without any provision of habits of acting sanely and morally on any motives suited to his true and persistent self.

Every religion which asserts a dominant motive of action is, at the first, selective; those who feel its motive an inspiration accept it as their ideal. But when a religion begins to take itself for granted as having rights, as able to provide the normal motive for all, its power to induce physical, intellectual, and moral wreck is great in proportion to its immediate influence for good. And this is necessarily the case, however true may be the religion in itself.

Victims are truly sacrificed to the Moloch of religious fanaticism; however pure in itself may seem the ideal of the religion under which they suffer. Odin was originally a prophet who taught the worship of the *Allfather*; yet men were burned to death in his honor. "Crucifying and burning were merciful inventions compared to laying the seeds of nervous disease in the constitutions of children . . . which is what people are doing now in the name of religion."

The first of the causes of moral wreckage during nervous break-down is, then, the wearing out of the moral sentiments too young; the second is inducing young people to base their moral lives on a motive which does not appeal to them in all phases of the intellectual life.

Before proceeding to investigate the third great cause of future moral wreckage, it may be well to work a few examples. The reader is requested to take the following, not as a summary of ethics, but as isolated examples of the working of an algebraic notation, analogous to the practical examples which follow the theoretical portion of a chapter in a treatise on arithmetic. They are intended, not to dogmatise about conduct, but to illustrate the working of a method of investigation.

a. Supposing one had charge of a person whose medical advisers ordered him to be kept awake for a certain time (e. g., one suffering from an overdose of opium, etc.); what mental condition should one try to generate?

Ans.: Appeal to motives Y rather than X; and beware of motives Z. Also endeavor to fix attention on thoughts of discrimination, not of generalisation; of conflict rather than of unity. If the patient is fit for conversation, speak of any topic as to which he differs from somebody else, rather than of any topic, however interesting and exciting to him in health, his interest in which is of an abstract nature or depends on seeing unity among apparent opposites. Before he is fit for conversation, one may be ordered to shake him or slap him with wet towels; one should not apologise, or tell him one was doing it for his good; but rather try to irritate and rouse the sense of antagonism. One should not adopt a kindly

and pitying tone, but rail at him for perverseness and wilful laziness; rousing him, if possible, to protest that he cannot help going to sleep. (This example has been worked out by me on purely abstract grounds. I have had no experience of opium-poisoning, nor do I know what mode of speech is advocated by medical practitioners in such cases.)

b. Suppose one had charge of a person subject to *M*. The medical orders in such a case are to forestall each fit of *M* by inducing normal sleep a little before the time when *M* would otherwise come on. Having got the patient into bed and warm, and having administered a little light food, how shall one so direct his thoughts as to prevent *M* turning into some form of *B*, universally admitted to be bad (delirium or epilepsy), and induce it to take instead the form universally considered good, i. e., normal sleep?

Ans.: If the patient is a well-protected neurotic, do not try to direct them at all. Explain to him, once for all, the general direction to be taken by the treatment. Tell him that the usefulness of his whole life depends on his own docility and courage now. Bid him find out for himself what is the real core and centre of his heart's interest, what he cares about in all moods alike; what is "the soul that makes him one from first to last." Tell him to fix his mind on that sacred object whenever he lies down. When you have got him into bed, do not talk to him at all, except in response to his wish. If he likes to be read to, read what he wishes.

But if the patient belongs to the unprotected class, he will probably be unable to find his way in the tangle of morbid impressions; and you will have to direct him. Trance and epilepsy involve what may be called an irregular *fall* into an abnormal form of phase *B*. Therefore avoid as far as possible any appeal to motives *Z*, in order not to precipitate a too rapid fall towards *B*. Avoid also motives *Y*, lest you prolong *A* till the too rapid fall comes from overfatigue. Appeal entirely to motives *X*; and occupy the mind, not with abstract thoughts of unity, but with the *unification* of some ideas which the patient himself has lately been seeing in contrast or conflict.

This answer also has been worked out by me algebraically;

but, besides working it out, I have had a little opportunity of observing the efficacy of the method; especially in one case where a physician warned me that some terrible collapse, perhaps epilepsy, was imminent unless I could change *M* into normal sleep at once. The patient, a girl of seventeen, had been fearfully overstrained owing to family worries, and had then been half hypnotised by a powerful preacher who was himself in a state of unhealthy agitation about what he considered the pernicious influence of a certain scientific philosopher.

Now I venture to think that almost any one who had to treat this case by the light of empirical common sense would have decided to discourage the girl from thinking of either home cares or religious controversy, and would have tried to interest her in other topics. But it would be difficult to fix the attention of a patient on any fresh topic while so overstrained a state lasted; and, even if one succeeded, it could only be by introducing a new subject of excitement powerful enough to over-ride the two already in possession of the field. Algebraic analysis suggests a different way of carrying out the medical instructions, viz.: the *unification* of the antithetic tensions. I told the girl that her pastor's agitation was due mainly to verbal misunderstanding; and that what was chiefly needed in such a case was the presence, in his home, of a calm, wise woman capable of furthering his main aims, by correcting the mere accidental errors into which his very earnestness led him. I filled her imagination with the ambition to become a woman who might render such service to some inspired teacher of the future. I thus pulled together, so to speak, the tension on womanly duty of her active home life and the tension on religious ideals of her religious dream-life. And, every time I got her into bed, I read to her passages from the works of the obnoxious philosopher which expressed aspirations similar to those of her pastor but clothed in language which the latter could not understand. The success of this treatment was so marked that I was more than consoled for the storm which burst on my head when the divine learned that I was indoctrinating his most promising catechumen with the views of the infidel whom he had denounced; he had the discretion to be

silent about my iniquity in presence of my patient; and I here mention his anger only as an instance of the difficulties which hamper teachers in the attempt to carry out medical advice.

c. What should be the dominant characteristic of thought when preparing for repose?

Ans.: Unity: rather than classification, discrimination, contrast or strife.

d. What should be the dominant characteristics of active study?

Ans.: Classification, specialisation, contrast.

e. How can an adolescent minimise for his future the risk of accident from carelessness (by fire, being run over, etc.) during fits of brown study; and of suicide during some short period of mental aberration?

Ans.: By linking all habits connected with self-preservation, during the process of formation, with some motive connected with a cause revealed to him in a day-dream and approved by his waking judgment.

f. What should be the ideal present to the mind during private prayer?

Ans.: Some ideal which has not been merely thrust into the mind from outside; but which has been revealed to the individual from within in some inspired moment, and afterwards recognised by his reason as worthy of devotion.

g. What should be the characteristics of a religion publicly taught for the purpose of establishing ethical conduct on a safe basis?

Ans.: It should be neither polytheistic, nor dualistic, nor purely monistic, neither should it be in any sense idolatrous. It should present to consciousness an ideal of human character; but should not present any conceivable ideal of any sort as an object of actual *worship*. The object presented for worship should be an inconceivable Unity from whom emanate all differentiations, and who wills that men should differentiate and discriminate. This leaves room for each soul to find for itself its own ideal of motive.

(The reader is requested to observe that the above is given as the answer, not to any question about the nature of God, but to a

question about what is the kind of public religion most conducive to ethical stability in man.)

h. Are there any precautions which an adolescent can take towards the protecting of his future self from the risk of becoming, in middle life, a morphia or alcohol maniac?

Ans.: Convivial drunkenness is under the control of the will at the time; the man should avoid it by avoiding company where he is tempted. But a habit of solitary nipping, begun to relieve nervous symptoms, may overtake any neurotic, however strong his intention to avoid it, unless he has prepared himself by two precautions beforehand. He should form in youth a steady habit of connecting the care of health and the regulation of diet with the desire to maintain his fitness for some work, the value of which has both been felt by him as an inspiration and been believed in by his reason. And he should avoid taking, during solitary day-dreams, any more than his usual allowance of fruit, lemonade, sweets, or anything specially enjoyable. It may be well to exceed that allowance occasionally; but it should be always, if alone, while engaged in reading or some active pursuit; if in company, while talking of external things, not while engaged in the endeavor to arrive at inner principles.

Few things are more important for ethical stability than the habit of connecting dreamy moods, not with extra physical indulgence, but with slight extra physical abstinence. (This caution in no way relates either to general asceticism, or to severe fasting at any special times. The nature and quantity of the food taken should be settled by each individual under medical advice. The special psychological caution is that impulses towards special physical enjoyment should not be obeyed in phase *B*.)

This habit of abstinence from extra indulgence during all dreamy moods is the habit that confers on the organisation the extra-natural power of which I spoke, of arresting the action of an organ which the Will cannot for the moment guide. It is the secret of longevity for the higher mental faculties.

k. How should a girl under twelve be taught habits of neatness in dress?

Ans.: By being sent back to make herself clean and tidy whenever she has neglected toilet operations. This should be done in a cheerful, matter-of-course way, giving no reasons and appealing to no motives. The child should be left to find out for herself whether her motive for taking pains is pride in her personal appearance, or the wish to avoid being sent back, or the desire to please her mother. If she asks why one should be neat, she should be told, in general terms, that one should form the habit of doing accurately whatever one is bound to do at all, either by duty, or by necessity, or as hygienic exercise; and be careless only about things done for no purpose except to facilitate absolute relaxation.

l. Suppose a girl has the essentially artistic temperament; she has the natural tendency to arrange life and thought on artistic, rather than ethical, religious, or scientific lines. What mode of education is least likely to cause her, supposing her health gives way, to become either conspicuously slatternly or excessively extravagant in dress?

Ans.: We will suppose, first, that she is prepared for confirmation by an enthusiast who denounces the lust of the eye and the pride of life; and dwells on the simple tastes and ascetic tendencies of great saints, the beauty of holiness, and the wickedness of spending money in vain show which is needed by the Lord's poor. This exhortation passes down into the girl's inner mind, all the more plentifully because the preacher is to some extent hypnotising her by his earnest personality. It is there seized upon by her own true temperament, and fused into an ideal of simple living, which is artistic in its essence, but is mistaken for a religious ideal. It of course begins to externalise itself in frocks of severely simple cut and devoid of ornament; in little economies, and in contributions to charities large for her means.

All this has been dominated by a *Z* motive. Her waking external self has seen the "beauty" of many things besides holiness and nun-like customs. She has resisted the temptation to see the loveliness of the outer worldly world, as a wile of Satan. But every time she has seen it, it has done something to unsettle her puritanism. If she remains fairly healthy, she will, on reaching

maturity, gradually "out-grow" her religious phase, and probably adopt a mode of dress dominated principally by artistic quality; but all the more artistic and picturesque, because, during her ascetic period, she acquired a *habit* of simplicity. But if the breaking down of the artificially induced religiosity should happen to coincide with nervous break-down and general failure of mental power, she has not the force necessary for reconstructing her life. The artistic nature may assert itself so suddenly as to carry away all habits, and so imperiously as to set up a tendency to buy at random whatever she feels momentarily capable of using in any artistic combination, regardless both of suitability and of cost.

Now suppose that this same girl had not been religiously impressed, but had been captivated by a refined woman of the world, who showed to her the beauty of a society where each individual dresses and behaves with regard to "fashion," that is, to the prevailing taste of the majority at the moment, rather than in conformity with her own personal taste. Fashion, as a social factor, is seen, in *A* phase, to have an ethically artistic value as a social combiner; the girl throws herself eagerly into the task of making herself socially irreproachable. But every now and then, in *B* phase, the deeper nature within her reveals to her that humanity consists of many parts besides fashionable "society," and that fitness for that society is a very partial mode of taking one's place in the great whole; and, in particular, that all true artists would like the effect of her dress better if it were less fashionable and more really artistic. Every impression of this kind weakens the foundations on which her habit of care in dress is being built up. If she remains healthy, she will gradually shift the habit of attending to her dress on to a more really artistic basis, one more conformed to her true self, and therefore more stable; and then the habit itself will be of great use in assisting to carry out her new and deeper conceptions of what is suitable. But if the discovery of the foolishness of fashion coincides with a failure of power, the whole habit of attention to appearance is likely to give way; and she may drift into the habit of a slovenliness which is often sordid, and yet, by fits and starts, very picturesque.

But if the girl of artistic nature falls into the hands of a teacher who inculcates both simplicity and neatness as factors of a harmonious existence, her dress may be at first neither as simple as under the former of the two modes of treatment described above, nor as careful as under the second. But the simplicity and the neatness will probably be of life-long growth. If she preserves her health, she will probably combine with them some form of artistic career,—whether as painter, musician, poetess, or novelist. But should her mental power give way, she will remain daintily neat and quietly picturesque in dress, and perhaps become moderately successful in some art on an amateurish and domestic scale.

* * *

We now come to the third cause of moral instability; the one which I have likened o a water-leakage. The majority of teachers try, as I said, to keep their pupils out of normal monistic phases, to an extent not sanctioned by any great psychologist. All sorts of excuses are made for this: the need to use up time in learning to know the outside world; the examinations looming ahead; pressure of competition, etc., etc. These excuses seem genuine, until one notices that the manner in which the practice of average educational practitioners differs from that of great educational authorities is reflected in other regions, where no such motives can possibly have any sway. For instance, in a large lunatic asylum where I have stayed on visits, the doctors and nurses seemed to me as kind and conscientious a set of people as I ever saw; but thinking of their conduct in the light of certain admitted principles of medical psychology, I often found myself wondering whether they or the patients were the more insane. The whole staff seemed to me to be simply mad of a monomania for pulling patients out of phase *B* into phase *A*, because they did not know how to guide phase *B*. On one occasion I was sitting in the part of the grounds reserved for the more intelligent and cultured patients, when a somewhat glaring case occurred of irreverence on the part of a good-humored and kindly nurse towards a patient's attempts to recover a lost clue of memory. When the nurse left us, a conversation took place among the patients, of which I remember the following scraps:

"We are here not to be cured of a disease, but to be taught to lie." "No one helps us to guide our minds"; "none of the authorities know any psychology." (Some of the patients knew enough psychology to be excellent advisers to each other.) I should like to hope that the staff of this institution were more ignorant than such officials elsewhere.[1] But the nurses showed me a printed examination paper, sent to candidates for a certificate of competence to undertake the charge of patients suffering from mental disease; as to which I could only ask myself: "Is it possible that any sane man could have drawn up such a document in a world wherein great masters of psychical science have lived and written?"

The ordinary teaching of any religion differs, in a similar direction, from the precepts of its founder. Every great founder of a spiritual religion aims at so organising thought and action during *A* as to make it act on *B* in a way which causes each *B* phase to react usefully on subsequent *A* phases; the ordinary teachers of the religion make of the very words of the founders on that subject part of the apparatus used by them for the purpose of keeping pupils in phase *A* and out of phase *B*; as, for instance, when parents occupy what should be the Sabbath repose time, in making children learn and repeat and paraphrase passages from Scripture about the duty of keeping Sabbath, and the unity of the Divine Essence; about communion with God and about not grieving the Holy Spirit.

The truth would seem to be that commonplace persons of all kinds fail to understand directions given by great teachers for the sanitation and guidance of phase *B*; but they understand how to pull the pupil or patient from *B* to *A*; and, as that is all they know how to do, they suppose it to be all that is worth doing. All kinds of mental treatment tend, when they become popularised, to slip down hill, from the attempt to sanitate phase *B* towards attempts to eliminate it.

But no intellectual culture is possible without some monistic action of the mind; teachers therefore interrupt *A* action every

[1] Asylums kept by members of the Society of Friends are said to be superior to most others in this respect. The Friends have the hereditary habit of respect for silent communion with the Unseen.

now and then to insist that pupils shall set up irregular short scraps of *B* action in the middle of *A* action. "Think, children, think, what does this remind you of?" "Don't you see that . . . .?" They expect to receive immediate answers to questions sprung on the class in the middle of work; questions of a kind which should have been asked only at the end of the class, and left to be thought out at leisure and answered on some future day. This of course tends to weaken and disorganise the faculties of comparison and the grasp of general principles, in the majority of pupils. But there are always a few "naturally protected" monists, in each generation, whom teachers may to some extent harden and make inefficient, but cannot turn aside from their true function. Some of these become what are called philosophers: men who spend their lives in writing ponderous books, to prove simple truths which ought to occur naturally to everybody. These men present to the outer consciousness of their readers and hearers ideas which should never come into consciousness except as the latter is informed by the unconscious or inner mind. The path of such a teacher is often marked by a broad track of nervous and moral wreckage: a phenomenon which seems to astonish many persons, but which appears to me as little to be wondered at as the digestion wreckage which would follow in the wake of a physician who should insist on feeding his patients with ready-made chyle. Few things are more important to mental health than that each individual should be able to generate within himself as much monistic philosophy as he is ready for, and should have the instinct to avoid absorbing any more than he is fit for.

Ethical teachers, in years gone by, observing the baleful results of teaching to the masses any monistic or pantheistic ideas, used to rail at those ideas themselves, and declare them to be contrary to religion and dangerous to morals. They had better have directed their attack at the attempt to put in from without what should have come out from within. Pantheistic philosophy is not in itself more dangerous than the great generalisations of algebra, geometry, or logic; which also should come out from within after the facts have been put in from without.

The truth however must be faced that *all* monistic work, when done on a serious scale, brings with it its own peculiar dangers. This brings us to the fourth cause of moral wreckage; lack of due preparation for the visits of the Great Inspirer.

A mathematician once said, in allusion to some of his own discoveries, "There are some things that could never be done unless some men would consent to be ill in order to do them." He meant to designate by the word "ill" a condition not morbid in itself, a condition strictly physiological not pathological, a condition which resembles parturition rather than disease. It is normally attended by some symptoms often associated with illness; and, without being disease, it is a condition favorable to the setting up of certain forms of disease unless special precautions are taken to prevent it. No great original work in abstract science, no great generalisation in any natural or physical science, is made, nor is any great work of art generated, without the author having gone through one of these singular phases. Parturition in science or art is a special mode of phase *B*, in which the faculty of monism goes through a period of work unusually profound and prolonged; the externally discriminating faculty being wholly or partially in abeyance for a longer period than usual. The individual is absorbed into communion with τὸ πᾶν, the I Am, the Great All, with whom a thousand years are as one day, and to whom all that is made seems good alike. Now the Greeks have told us how Pan manifests himself to many of those who commune with him without due preparation.

No human being, however good his intentions, can be sure that when he is in a deep fit of scientific or artistic abstraction, he will be able to feel, to any ethical purpose, the difference between lemonade and brandy; between an innocent sweetmeat which pleases his palate and some nauseous drug which gives him experience of new sensations; between the sensuous sting of a self-flagellation and the sensuous sting of a fleshly lust; between his own wife and other men's wives; between other men's sisters and his own; between a woman and a child, or a man, or a beast. All habits of moral discrimination may be suddenly merged in one flood of monistic generalisation; and if the constitution has set up

a habit of indulging, during phase *B*, any kind of freaks of physical caprice or curiosity,[1] there can be no security against any sort of sudden crime in some such phase; or against its becoming the starting-point of a vicious habit. The only kind of habit which is a safeguard is that of abstaining in all dream-moods, and as long as any haze of dreaminess remains, from all stimulation of strong sensation, from all modes of gratifying caprices of appetite, and from all active and positive violations of the established routine of one's ordinary life. The condition to be aimed at for creative moods is, not physical discomfort, but physical neutrality; the possibility of forgetting, as far as may be, that one has a body. This neutral condition should be prolonged till the outer *A* consciousness has been fully re-established. On the other hand, slight departures from routine in the negative direction are eminently desirable in dream-moods. A little less indulgence than usual in any kind of food which is either a special pleasure to the palate or a special strain on the digestion; a little less stimulant; and especially less indulgence in witticisms, jokes, and flippant conversation, should be a matter of course during moods of creative generalisation. Any compensating indulgence which may be thought necessary should be taken afterwards.

The tactless mother, sister, or young wife who worries a man possessed of any originality with such remarks as:

"You are working so hard just now; I am sure you need more food than usual; and you are taking less. I am sure a glass of wine couldn't hurt you. Why won't you eat lobster salad this evening? You generally like lobster salad. Are you ill? Is your stomach out of order? Why are you so unsociable? What makes you look so solemn? What have I done to offend you? I don't believe you care for me as you used to do." Or, "Why won't you take Lydia Featherhead out to hear the nightingales? Don't be such a prig; her liveliness doesn't mean any harm; it is only her manner. How can you be such a bear to a girl who admires you

[1] The combination, or rapid alternation, of monistic thought with attention to physical sensation constitutes a form of phase *C*.

so much?" etc., etc., may be doing worse than merely making herself a nuisance; she may be preparing the way for some ghastly tragedy, by breaking down the fences which the man is instinctively building up for the protection of his future life from moral ruin. It is pitiful to observe how strong is the instinct of self-protection in this matter, in most young people possessed of real genius; and how frequently it is undermined by conformity to the wishes of friends or to social custom. Probably some of the most revolting forms of decadence in literary and artistic circles have owed their origin to Academic Symposia where youths discuss the underlying principles of life and science and art, in a luxurious atmosphere, where what is only meant for a graceful hospitality favors indulgence in choice fruits, coffee, and cigars, with a very moderate quantity of specially flavored wines, or even without any wine at all. He who is to do great original work, either of abstract generalisation or of artistic conception, must be a consecrated priest of holiness if he would not become an agent of evil. Monistic perception of relations among the most innocent seeming material, if undertaken under unsuitable conditions, is a long step on that downward road which is paved with good intentions; and at the end of which stands Pan, the Satyr, grinning at the foulness in which all things are confounded.

Neither piety nor habits of general asceticism seem to be of much use here; fasting prolonged till one feels painfully hungry is as dangerous as drinking till one feels gloriously drunk. The most pious saints, those who most habitually mortified the flesh, have been among those to whom Pan appeared in his vilest forms. Nor on the other hand, does mere attention to physical health seem much of a protection; disease is as often a consequence as a cause of a career of bestiality; such a career may easily be slipped into from a condition of buoyant health.

But, in spite of all dangers, monistic generalisations must go on; and mankind must find out how to make them safe. The fertile union of polar opposites is an essential element of all true being. No medical system would be considered sound if its only notion of minimising the dangers of parturition consisted in mak-

ing as many people as possible barren; sound medical science aims at making fertility a socially manageable factor and parturition individually safe. So also sound educational science would aim at making monistic mental action not a danger, either to social order or to the sanity of the individual thinker. The worship of unity is the first commandment in the ethical Decalogue. If associated always with meditation and abstinence, it is the first step on the road which leads "to those fountains whose streams run never dry; to those holy heights of Being where all resentment die;" and where, to the purified soul, all things alike are pure.[1]

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[1] I would humbly venture to suggest that Nordau, and even to some slight extent Dr. Maudsley, have been misled by a false assumption. Because the heavy monistic dream-state in which great ideas are conceived has some of the symptoms of mental disease, and also is one in which mismanagement easily induces disease, they have supposed that that state itself is in its nature unhealthy. It should be remembered that many women are, on the whole, the better in health, not the worse, for occasional parturition under safe conditions.

My warm thanks are due to Professor Wm. James for valuable corrections and suggestions in connexion with this paper.

EXPERIMENTAL INVESTIGATIONS OF TELEPATHIC HALLUCINATIONS.[1]

I.

"Acta non verba."

IF there is a problem that occupies mankind more than any other it is undoubtedly that of death, or rather of the further side of that eternal trance and its probable to-morrow. Primitive man, like his fellow of the twentieth century, was hypnotised by this sudden cessation of organic vitality and the destruction of a brain in which were sighing so many dreams and slumbering so many desires, especially the consciousness of endless existence. The psychology of this contemporary of the past ages of mankind when society was not yet organised, so far as we are able to conjecture it by more or less exact inductions, speaks conclusively for this need of immortality, a need which possesses us of more civilised times to such a degree that we very easily grow daft over the crudest reports which hint at the persistence of our *ego* beyond the terrible bounds of death.

Life, or the adaptation of our organism to its environment, is of such a nature that the persistence of our individuality is, as Spinoza said, a psycho-physiological and psycho-social necessity, which represents the essence of our nature and is at the same time the only force that directs and shapes our aims, a vague obsession that is mournfully projected during each stage of life into a distant and

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[1] C. Flammarion, in his work *L'Inconnu* (p. 223), accuses M. Marillier of having misrepresented the sense of the title of the English book *Phantasms of the Living* by translating it "Telepathic Hallucinations." But the phrase seems to me well chosen and exact, and I shall employ it as adequately suggesting the scientific and psychologic value implied in these psychic phenomena.

ever more distant future, an intangible chimera. Yet despite all the deceptions and all the griefs endured by all the past generations, despite the conclusive demonstration that in this obsession we are but dreaming, amusing ourselves with more or less subtle argumentation, reveling in one illusion only to mourn another, despite the experience of thousands of generations we continue persistently and constantly to dream, to beat upon this mysterious gate of the unknown which down to the present day has but returned a distant echo of our prayers in the form of legends, dreams and beliefs, which have intoxicated our mental life and actually systematised our thought on this topic.

The end of the nineteenth century will mark an important date in the history of this branch of science, for never until now have these vague suppositions, these light and tenuous tissues of false judgments, of legends, emotions, dreams, and beliefs been subjected to a scientifically methodical and systematic investigation by specialists. Fantastic hearsay-reports, the value of which varies with every temperament that intercepts and transmits them, can be made to render up their truth, if they contain any, only by experience and observation. For we must not pass over in silence this need of eternity, this hunger for survival, which, to say nothing of the logical intellectual necessity for giving account of oneself, has always been fed, and continues to be fed increasingly, by facts and marvels confirmed by the first comer and accepted by everybody else. And the facts have become so numerous, as confirmed by this great human public, that they have entered into the hackneyed domain of "facts that are not even discussed."

To this stock of common rumors has been added the authoritative opinion of many thinkers who while masters of experimental science have not ceased for a moment to give credence to these beliefs that border on the miraculous. Consequently there must be something in the matter, even if it be no more than a systematic hallucination, conscious or not, which forces itself like a pathological obsession upon every thinking being.

What, then, is this question? It is difficult, if not impossible, to formulate it; however, it is necessary to do so if one is to treat

the question in a scientific manner, *more geometrico*, as Spinoza said. The undertaking is logical, and scientific methods imperatively demand it.

If we study it close at hand with the strict technique of the exact sciences, we become convinced that even in the public mind and in the everyday general conception the problem has two aspects: the first deals with the possibility of annihilating space, putting oneself into relations with another living being who is breathing, sighing, or suffering in the torrid atmosphere of India, on the smiling plains of Lombardy, on the banks of the Danube, or anywhere else. The miles that separate two brains count then for nothing, and sensation, that inexplicable marvel, traverses space with miraculous speed to excite in the brain of the receptive person an image corresponding adequately to the original stimulus. The second aspect touches the apparition of the spirits or images of the dead after the dolorous stage of death and the dreadful sequestration beneath the burden of the sod. Death now amounts to nothing, and the image, the spirit, the soul—we cannot say just what—escapes this envelope of brute matter to assume the impalpable garb of a diaphanous phantom which rides upon the moonbeams, traverses the starry firmament and appears from time to time to those well beloved, to recall to them the memories of the past, the life of the time when like them it too was alive, a dreamer, an earthen vessel. And, more miraculous still, these phantoms have been photographed; consequently their impalpability is of the nature of ether, since their essence—an image—can make an impression on a photographic plate.

These perpetual problems in the brains of scholars have changed their data while retaining the strong metaphysical stamp, the diaphanous garb of dreams and of the supernatural. There is one very great excuse for this. The problem offers no immediate data, but presents itself in very vague form. Yet why should we not try to classify the facts that have been gathered, to bring a little order into this world of hallucinations, for who knows but there is a great truth here, something that may escape us. The diamond as

well as the ores of the precious metals need special reagents to bring out all their brilliant possibilities.

And what do we know of life? Whence come the limitations of our knowledge? The future may bring us so many surprises! In this connexion we cannot avoid reproducing some words from the beautiful preface which M. Charles Richet wrote for the French translation of *Phantasms of the Living*.

"When we compare our knowledge of to-day with that of our ancestors of 1490 we marvel at the conquering march of man within these four centuries. Four centuries have sufficed for the creation of sciences which had no existence even in name, from astronomy and mechanics[1] to chemistry and physiology. But what are four centuries compared with the future which is opening to man? Can we suppose that we have in this short time exhausted all that it is possible for us to learn? In four centuries more will not our great-grandchildren of 2300 A. D. be astonished at the ignorance of our day? And still more astonished at our presumption in denying without investigation what we do not understand?

"Yes! Our science is too young to have the right to be absolute in its negations. It is absurd to say: 'We shall go no further; here are facts that men will never be able to explain; here are phenomena that are absurd, and which we should never try to understand, because they pass the limits of our knowledge.' To speak thus is to limit ourselves to the small number of laws already established and facts already known; it is to condemn ourselves to inaction, to deny the fact of progress, to reject in advance one of those fundamental discoveries which open an unknown path and create a new world; it is to put routine in place of progress.

"In Asia a great people has remained stationary for thirty centuries because of having reasoned thus. There are in China mandarins who are very learned and very erudite, and who pass marvellously difficult and complex examinations, in which they have to show a thorough knowledge of the truths taught by Confucius and

[1] The reference is doubtless to modern scientific and physical astronomy and to dynamics, since the ancients made considerable progress in astonomy and in statics and hydrostatics.—*Ed.*

his disciples. But these mandarins do not dream of going beyond or ahead of these teachings. They do not venture away from Confucius. He is their whole horizon, and they have become so fossilised that they cannot comprehend that there is any other.

"And yet, in our civilisations that are more friendly to progress there prevails a somewhat similar spirit; we are all more or less like mandarins; we should like to enclose the sphere of our knowledge in our classic books and prohibit going outside of them. We reverence science, and not without reason we pay to it the greatest honors; but we scarcely permit it to wander outside the beaten paths, the road laid out by the masters, so that a new truth runs a great risk of being treated as hostile to science.

"And yet there are new truths, and strange as they may appear to our customary mode of thought, they will be scientifically demonstrated some day. This is unquestionable. It is a positive fact that we overlook startling phenomena which we are unable either to observe or to call forth. The well-attested hallucinations which are the chief object of this book constitute doubtless a portion of these phenomena, difficult to see because our attention has not been sufficiently directed to them, and difficult to accept because we are afraid of what is new, because old and brilliant civilisations are dominated by neophobia, because we do not wish to be disturbed in our indolent calm by a scientific revolution which would upset commonplaces and official data."[1]

This beautiful page of M. Charles Richet's cannot but inspire the impartial investigator with a different conception of the poverty of our knowledge, and brings before his eyes a different ideal from that of the famous *ignorabimus* of Dubois-Reymond. *Ignoramus*, yes, but not *ignorabimus*, for why and to what end, limit so positively the condition and the power of our knowledge for all time, by the poor brain of the twentieth century? What we know, a priceless and wonderful treasure, is not sufficient to put a *veto* upon our judgment and our investigation. All these brains that are

[1] *Les hallucinations télépathique par Gurney, Myers et Podmore*, an abridged translation of *Phantasms of the Living* by L. Marillier. *Bibl. de Phil. contemporaine*, 1899, 3 ed., Vol. I., p. v.

searching and working in all parts of the world, and which are growing keener with every century, armed with more delicate and ingenious methods, will probably analyse even the true nature of a sensation, and will be able to follow the evolution of thought in time and space. What is a miracle for one century becomes a commonplace for another, and nothing is inherently impossible. Everything is probable, and the best scientific attitude is to confess our ignorance regarding a fact before denying it, and not to exclude its possibility until it is shown to be utterly incompatible with the body of our well-established knowledge—and not even then.

II.

Let us divide the subject into two chapters: The first will deal with the problem of the *transmission of thought* between living individuals, and the second that of the appearance and manifestations of the dead, which subject will be treated in another article. We shall review briefly the investigations already made, the state of the question before exploiting our own results from the observations we ourselves have made. The state of mind that will guide us, while leaving the widest range for every probability and for the demonstration of the most fantastic hypotheses, will be to see whether an observation tallies, in however slight a respect, with current scientific standards and at the same time refuses to submit to the logic demanded by all investigation and observation. Nature teaches us every day the mighty truth that there is no effect without a cause, and that there are general laws which govern in every mechanical, psychical, organic, or other manifestation.

What are we to think of the transmission of thought at a distance? A series of studies has been made by the committee of publication of the London Society for Psychical Research, the soul of which was the late G. B. Gurney, an English psychologist of great worth.

The inquiry pursued by Gurney, Myers, and Podmore at the request of the committee of the Society for Psychical Research, which had furnished to these authors the greater part of the documents used, is very remarkable. It is known that the Society for

Psychical Research, founded in 1882, aims "to devote itself to the study of new questions, without prejudices or preconceptions of any sort, in the same spirit of exact and impartial research which has enabled science to solve so many questions equally obscure and debated with equal warmth." This programme is sufficiently explicit: the bulletin which has appeared regularly ever since, has formed the archives in which numerous and minute observations on telepathy, theosophy, apparitions after death, and many other phenomena more or less close to the borders of our knowledge whether scientific or practical, are catalogued with pains and perseverance worthy of all honor.

The inquiry has been taken up in England, in France, and in the United States, and had as its aim: (1) "To collect documents relating to telepathy; (2) to determine the proportion of hallucinations which coincide with an actual occurrence to the total number of hallucinations in normal subjects; (3) to determine the proportion of persons who have experienced one or more hallucinations to the total number of the population."

A circular of questions was drawn up to this end and the following instructions, which we reproduce from the Prospectus of M. Marillier, were sent to persons desiring to communicate telepathic facts:[1] "(1) It is highly desirable to obtain from the identical person who experienced the hallucination a detailed account of the facts. The accounts should be signed (the names of the persons will not be published in any case without an express authorisation in writing). (2) The date of the event which is alleged to have coincided with the hallucination should be confirmed as far as possible by the testimony of persons independent of the subject. (3) It is very desirable that persons who have heard of the facts from the time when they took place, or who have known of them in any way, should add their accounts to that of the subject. As far as possible it is necessary that there should be no concert among those who make the reports or between them and the subject, so that their accounts may serve as checks and corrections for one

[1] *Op. cit.*, p. xv.

another. (4) If the person who experienced the hallucination or those who have heard of it took notes about it at the time of its occurrence, it is desired that they furnish copies of these notes to the Commission. (5) It is particularly necessary that dates and hours be reported with great accuracy."

The Society for Physiological Psychology in Paris organised about ten years ago a commission for the study of telepathic phenomena, the members being M. Sully Prudhomme, president; G. Ballet, professor and fellow of the Faculty of Medicine in Paris; H. Beaunis, honorary director of the Laboratory for Physiological Psychology in the École des Hautes-Études; Ch. Richet, professor in the Faculty of Medicine in Paris; Lieutenant-Colonel de Rochas, director of the École Polytechnique, and M. Marillier, secretary.

The Society for Psychical Research reckons among its regular and honorary members scientific authorities of the first rank, among whom we mention: Mr. Wm. Crookes, H. Sidgwick, Alfred Russell Wallace, Myers, Adams and others, while Gladstone, John Ruskin and Gurney were of their number. Among the corresponding members in France we may name: H. Beaunis, Bernheim, Féré, Pierre Janet, Liébeault, Ribot, Richet. In America the same investigation is carried on under the direction of the great psychologist Mr. Wm. James, and in England under that of Mr. H. Sidgwick. In France M. Marillier had begun some time before 1892 a similar investigation, but so far as we know there has been no publication of results.

The outcome of this tremendous amount of research, directed, as it seems, with great tact and with every possible precaution, has been most interesting and most definite. Telepathic hallucinations do exist, are genuine facts and correspond to actual sensations. By this expression, "telepathic hallucinations," Myers, the author of the Introduction to the *Phantasms of the Living*, meant to indicate "phenomena which may give us some reason for supposing that the mind of one man acted upon that of another without the utterance of a sound, the writing of a word, or the making of a sign." Along with this category of phenomena have been classified, not apparitions of the dead, but only apparitions

of the dying; the investigation has applied itself very methodically and published the investigations collected. The apparitions of the living are manifested in the following cases: Either at the point of death, or while a person is passing through a grave crisis he has appeared to another person.

The tabulation and abstracting of the responses received as a result of this inquiry has led the authors appointed by the Society for Psychical Research to draw the following conclusions:

1. Experience proves that telepathy, that is, the transmission of thoughts and feelings from one mind to another without the intervention of the organs of sense, is a fact.

2. The testimony proves that persons who are passing through some great crisis or are about to die appear to their friends and relatives, or express themselves to them with a frequency that cannot be explained as mere chance.

3. The apparitions are illustrations of a supra-sensible action of one mind upon another.[1]

Indeed, the facts published by these authors seem to be conclusive; they have sufficed to convince such an authority as M. Charles Richet. The analysis and the criticism of the observations is very ingenious, and we recognise on every page the effort of the authors to give a genuinely scientific aspect to their work and to utilise all the facts of biology and the data of experimental methods.[2]

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[1] *Ibid.*, p. 12.

[2] Mr. J. G. Piddington, of the Society for Psychical Research, who has had the kindness to read my article, has called my attention to a work of Dr. Parish, published in 1892, who, it seems, has made some similar critical studies on the subject of investigation cultivated by the honorable society. For myself I know nothing at present directly of this work of Mr. Parish, and I learned something of its contents only a few days ago through a *résumé* given by M. Franck Hales in the conference conducted at the Institute Psychologique International on the history of the Society for Psychical Research in London (*Bulletin de l'Institut*, No. 2, I. année, Avril, 1901). Mr. Parish has assumed an individual point of view and discusses the investigation of the Society, while I discuss and criticise the mental condition of any subject about to reply to any circular whatever that demands of him a response to such a transcendental question. We agree indeed in several points, and I congratulate myself on this confirmation. As for the replies of Mr. Sidgwick, I know them; they are judicious and skillfully formulated but err in

Since the publication of the *Phantasms of the Living* the London Society publishes regularly in its *Proceedings of the Society for Psychical Research* new observations, all of them documents of great value. In France *Les annales des sciences psychiques*, edited by Dr. Dariex and published every other month by Alcan, is likewise a record of the highest distinction for observations of this kind. Whoever is interested in these curious problems will scan the ten volumes of this publication with much gratification.

Moreover, the question has been discussed before several congresses of psychology, and recently at the Third Congress of Psychology, which was held at Munich in 1896, Professor Sidgwick made a report of new observations which were positive and conclusive.[1]

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their very eloquence and want of scientific precision. I have only to say that even if the person who replies to the inquiry gives his address and his profession, the value of his reply does not thus gain enough from the point of view of the individual mental criterium, and it is exactly toward this point that my investigations are directed.

I wish to thank Mr. Piddington especially for his kind advice and particularly for his obligingness in putting at my disposal the *Proceedings* of the Society for the detailed illumination of my personal investigations.

I limit myself for the present to this summary and synthetic exposition, intending in other publications to return to the details of my researches with the plentiful documentary evidence that I possess and of which I have given here but the essence. I shall lay particular emphasis (1) upon the psychology of the mental state of the mediums in which it has been possible to carry on this investigation; (2) on the beliefs caused by actual hallucinations; (3) on the part played by the emotions in the systematisation of an hallucination; (4) on the localisation of memories in time and space; (5) on mental synthesis and on psychic polarisation, if the expression may be permitted in connexion with metaphysical and transcendental data.

Mr. Piddington has kindly called attention to the value of these points: in his opinion they are "of great value" and worthy of the attention of the Society for Psychical Research in London (this from a personal letter). It is true that in these points lies the chief originality of my investigations on telepathic hallucinations, and I am indebted to Mr. Piddington for having called attention to them. Paris, April 20, 1901.

[1] "On a statistical inquiry into sensory hallucinations experienced while awake by persons in ordinary health." *Dritter Congress für Psych.* München, 1896, pp. 390–394.—"Experiments in involuntary whispering and their bearing on alleged cases of thought-transference." *Ibid.*, pp. 404–408.—"Ist es möglich, durch eine internationale Hallucinations-Statistik einen Beweis zu erbringen für die Existenz telepathischer Einwirkungen?" Dr. Bager-Syögren, Upsala. *Ibid.*, pp. 394–404.

III.

I am aware that Messrs. Gurney, Myers, and Podmore in their review try to refute every possible criticism and appeal even to the theory of probabilities in order to elucidate and bring out the value of the proportion between the negative and the affirmative responses. They reveal very clearly what they mean, and in no wise exaggerate the bearing of their thought, studying with truly commendable care the causes of possible error. In respect to transmission of thought they even go so far as to make preliminary experiments, zealously taking into strict account the probability of divination, suggestion, chance, etc.; and every fact is sustained by numbers, whose probability is always stated. The result is always that the number of affirmative cases greatly exceeds that of the probable cases.[1]

Such rigorous supervision ought to inspire confidence in all sincere men. But let us pause a moment to discuss the value of the data, the facts which served as the elements in this delicate calculus of probabilities. A probability opposed to a certainty is far from being a paradox, and despite the paradoxical appearance of the problem, one can calculate perfectly something that one does not know, or rather the value of what one might know and recognise. The vague instinct, common sense, is far from being in condition to set at nought the support of these learned calculations which establish well enough within certain limits the bearing of the conclusions that they involve and the application of the theory of probabilities in the realm of psychic science. Although far from having that necessary intervention which it has in purely scientific problems, all the sciences being but unconscious "applications of the theory of probabilities", it may nevertheless yield some assistance. However, we must remark that in psychology we are far from the mathematical sciences, where one may even propose prob-

[1] Read on this topic a most instructive article by C. M. Richet published in the *Revue philosophique*, 1884, Dec., "La suggestion mentale et le calcul de probabilité."

lems in probability. The initial stage often escapes us in psychology, and is in fact for the greater part of the time a subjective probability, a very different thing from that other objective probability on which the physical and mathematical sciences depend in the solution of the greatest problems, making it possible to foresee phenomena that are only partly probable.

There has been, and still is, much discussion concerning the application of the calculus of probabilities in the mathematical and physical sciences, and many problems are reduced to definite terms only through the antecedent calculation of probabilities that were foreseen and figured out in advance and then verified by experiments that were more directly determinable. The theory of games of chance has been made the subject of several monographs since it occurred to Chevalier de Méré in connexion with "a cast of dice"; great geometricians and scientists have studied the question, among them Pascal, Fermat, Euler, Ampère, John Bernoulli, James Bernoulli, Lagrange, Laplace, De Moivre, Poisson, and even Huygens, to mention only those of the past. Recently M. H. Laurent has published in a monograph of the collection of "Aides-mémoires" a valuable synthetic study on the subject, entitled *Théorie des jeux d'hasard*,[1] with a lofty moral application. The conclusion from all this rich harvest, the fruit of so many choice minds, is that the probability of an event due to chance can be calculated very well and distinguished very clearly from a necessary and logical probability. This probability due to chance is equal to "the ratio of the number of cases favorable to the occurrence of a given result to the total number of cases that may be possible when we are awaiting this result, provided that all the cases, favorable or not, are equally liable to happen."[2] The questions raised by games of chance such as rouge et noir, roulette, lottery drawing, dice, valet de pique, brelan, target-shooting, etc., have been almost completely solved despite their complexity, and the conclusions are

[1] One volume, 176 pages, with extensive bibliography. See also Laurent: *Traité du calcul des probabilités;* Laplace: *Théorie analytique des probabilités;* Fermat, *Correspondence avec Pascal.*

[2] Laurent, *op. cit.*, p. 6.

morally salutary. "Gambling," says M. Laurent, "can never be perfectly fair; if it is so at the moment when the players are equally rich, it ceases to be so as soon as one of them wins."

The same rigorously scientific laws introduced into the study of psychic phenomena even in the time of Buffon, who left us the excellent *Essais d'arithmétique morale*,[1] trip, in our opinion, as we have said above, over the absence of perfectly precise primary data.[2] The theory of errors and the analysis of the law of Gauss may yield some help, but this help can only be reduced to differences in a feeble, a very feeble, measure of errors systematic and errors accidental. For the famous "bell-shaped curve" even in the physical sciences is far from being accepted in its entirety in our days, as we are assured even by M. H. Poincaré. A physicist will discuss with good reason the value of a good standard and the method of observation; he will prefer a good standard, having taken all the necessary precautions to avoid the least systematic errors, while the astronomer will reply to him, "But you cannot observe in this way more than a small number of stars; the accidental errors will not vanish." Hence no mathematical precision is possible, and the decision is reached, even while discussing the question, to "take sides" and adopt arbitrarily some fixed value.

In this connexion we cannot better express our thought than by transcribing some conclusions and reflexions of M. H. Poincaré, a mathematician who has studied the logic of the subject, and who is one of the most brilliant representatives of that mathematical philosophy which is so necessary to philosophers and in which Descartes, Kant, Leibnitz, Euler, and Newton, all the most generally recognised masters in philosophy and human thought, have distinguished themselves.

"In order to undertake any calculation in probabilities," writes M. Poincaré, "and even in order to give any meaning to the cal-

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[1] Supplement to the *Histoire Naturelle*, Vol. I.

[2] See the interesting treatise of M. Bertrand, *Calcul des probabilités*, in 8vo, 1889. Also Poisson, *Recherches sur la probabilités des jugements;* and Cournot, *Exposition de la théorie des chances et des probabilités;* and Goureaud, *Thèse sur l'histoire du calcul des probabilités*, 1848.

culation, we must recognise as point of departure an hypothesis or assumption, which always implies a certain element of arbitrariness. In the choice of this assumption we must be guided by the principle of "sufficient reason." Unfortunately this principle is very vague and very elastic, and in the hasty review we have just taken we have seen it assume many different forms. The form under which we have met it most frequently is the belief in the law of continuity, a belief which it would be difficult to support by apodictic reasoning, but without which all science would be impossible. In fine, the problems to which the calculus of probabilities can be applied profitably are those in which the result is independent of the initial hypothesis, provided only that this hypothesis is in harmony with the law of continuity."[1]

IV.

If we have dwelt at such length upon the bearing of the theory of probabilities, it has been done primarily in order to bring out the scientific value of telepathic investigations, and especially in order to make some objections to those young psychologists of the new school, who, far from being masters of their initial facts, apply algebraic formulæ at cross purposes and enlarge upon simple explanations with more or less startling formulæ, which is often a proof of incompetent observation and of a lack of the critical spirit. Their only purpose seems to be to show that they can juggle wonderfully with πR^2, ϕ, θ, and all the rest of the Greek alphabet, and easily illumine the dry text, the small number of observed facts. Far, very far, from possessing the prudence of a Richet, these gentlemen juggle with cosines as with apples, forgetting nearly always that they are building up a system with facts of which the surface has scarcely been skimmed by observation.

Even in the quiet of a laboratory, with instruments of unheard-of delicacy, and with the most careful manipulation, you find difficulty in establishing a scientific psychical fact. Consider what must be thought of a testimony that comes from a distance, of a

[1] "Réflexions sur le calcul des probabilités." *Revue générale des sciences.* 1899, p. 269.

casual observation made by *X* or *Y*, whose thought is predetermined according to certain laws of education, of environment, and of a host of influences and disturbing causes! We reduce everything to a system, and we are heedlessly led to seize upon a fact not only because it impresses our mind, but because it is the only one that we can establish. And every day we criticise crude causes of error which we take for some truth or other, while to-morrow this truth becomes in its turn a truth mixed with errors, and the crude cause of errors permits us to fix upon the true probable cause. It is useless to repeat the beautiful words of Claude Bernard, that we must let facts speak for themselves, but we must even go so far as to interpret them! The causes of error swarm in our conceptions and while looking toward a distant future, a paradise of truth and of light, an epoch in which we shall perhaps finally become perfect automatons, and in which the sun will no longer send forth its life-giving rays, we yet must resign ourselves to the conviction that our "sufficient reason" changes from day to day, and that the best observations may be but demonstrations of a fact correcting crude paralogisms. I purposely exaggerate the defectiveness of our observations, of our experiences, of our methods, being the first to believe in the value of experience compared with the fancies of transcendental metaphysics.

A set of questions is sent out. What is the state of mind of the person answering; what is his power of analysis; what is his education; what his competence? Of all the mortal beings that wear out their epidermis on the hard surface of the terrestrial globe, there are few that are capable of analysing themselves, very few. Moreover, mental types vary, and many a mathematician capable of solving the most important problems in mathematical physics, is not always and necessarily a scientific observer; his own psychic condition eludes him, and outside of his own domain which he masters admirably he is far from surpassing the state of soul of any simple mortal. Daily observation furnishes us at every step with typical corroborations, so that there is no need of further insisting upon this fact. From want of education, from organic incapacity, from unequal development of different cerebral centers,

we represent only a living fraction of the complete psychic life, and it is possible to interpret a phenomenon quite differently from what it is, and that unconsciously, despite the utmost honesty in recording the fact.

Our mental life revolves in a vicious circle, the narrower because there is no possibility of an incisive analysis and because it is subject to the action of numerous influences in our sociological environment. Let us suppose that the circular of inquiry fell into the hands of some one thus environed, a soldier, a financier, a teacher of gymnastics. The problems of life do not present themselves to such a man at all, and it is usually the case that he has no notion whatever of the least datum of life nor of his own endowments. Such a man will never be capable of distinguishing a false sensation from an actual one, and especially incapable of distinguishing a true objective hallucination from a subjective hallucination, the artificial and conscious fabrication of his own excited, wearied or anæmic brain. It even happens that competent persons, psychologists and psychiatrists of high standing, are unable to distinguish the real part from the projection of intellectual images while they are themselves absent-minded or occupied with ideas that possess them. There is here a preconception that amounts to a great deal, and beliefs very easily give rise to actual hallucinations and pave the way successfully for that other erroneous belief in the reality of cerebral projections, of chimeras originated in a feverish brain, whose centers of association have ceased to perform their functions normally, and in which the fixed notion prevents a stringent, exact and logical judgment.

The most learned of preachers inevitably believes in an apparition, and he has a large number of hallucinations in comparison with a scholar who has no other religion than that of the truth; he is in psycho-physiological conditions more favorable to an erroneous grasping and interpreting of his own perceptions. We know that perception is only a sort of hallucination, and we know that the mental life is intangible to a brain sealed up in *a priori* notions and especially of an emotional nature; and accordingly I ask myself, what guaranty we can have for testimony given under condi-

tions unsuited to experiment and when the subject is in the great majority of cases necessarily incapable of interpreting to himself the variations in his psychic condition. One who has barely learned to reason a little thinks himself capable of distinguishing *ipso facto* a true hallucination from a false one. The fact no longer seems surprising when the memory is called into play and the attempt is made to confirm the time, the hour and even the minute at which the phenomenon took place. The majority of well attested telepathic hallucinations, the very great majority, have to do with cases of misfortune, cases which I shall call emotional. Now, emotion upsets the intellectual condition, and exercises a considerable influence upon the memory and the judgment notably; investigations in this direction which I have carried on but not yet published enable me to declare unqualifiedly that this is so, though this is nothing new, for it is a matter of common observation and everybody can confirm it for himself. The notion of the death of a relative, the notion of a misfortune which may happen to some one dear to us, disturbs our minds in a measure proportional to our temperament, our sympathy, our impressionableness, our education, etc., and to the nature of the strange association which has appeared as it seems so suddenly. From this emotivity arises the great difficulty in giving full credence to a fact collected in this manner.

How can one fix the hour of an event precisely under such circumstances? Messrs. Gurney, Myers, and Podmore describe for us some of their methods and their checks, but it must be admitted that they are not completely satisfactory. I have been present during the arrival of many misfortunes in the course of my life, and having a passion for taking notes on whatever I may observe, I have made this general deduction, which is not without interest, that in undertaking to determine the precise time at which an event took place the errors are greater in proportion as the phenomenon is more intimate and more complicated. I was making an investigation on the localisation of memories, a work of which I published a portion in *L'année psychologique*,[1] and I established the fact that

[1] *La localisation des souvenirs. Année Psychol. 3ième année.* Pp. 199–224.

the more remote the memory and the more closely it touches the emotional condition of the subject, the more difficult it is to localise it with precision. The fact becomes more susceptible to causes of error when it touches this very curious domain, which constitutes the profoundest depth of our souls, the marvellous. Few facts are susceptible of being presented free from chance suggestions and from all serious exaggeration, which from some vague grief, from some indigestion, some roaring in the ears, implies the sensation and even the perception of a most distinct hallucination. Inasmuch as there is no basis of criticism for the marvellous, the imagination indulges in the most fantastic caprices and the strangest sensations are acknowledged by orthodox clergymen, to whom everything is possible, even the sight of the actual configuration of an angel, the portrait of the Virgin Mary.

Let us finish the list of our objections by citing the mental state of the subjects as one of the chief sources of error. The imagination is constantly at work, even in a mediocre mind, and furnishes the daily bread for this flight toward the infinite, for this excessive persistence in a mediocre personality. Even in connexion with the most commonplace reasoning power the imagination, thanks to its little logic, persists in soaring, were it only to the height of barnyard fowls. In such a mind everything is distorted and confused, all the more because it is dealing with ill-defined memories, ill-perceived and recorded perhaps only in the imagination. I have known and studied closely a man of science and unquestioned worth, who needed, however, to keep a perpetual check upon himself in order not to credit the most insignificant and false perceptions. This scholar cultivated psychology, but fortunately he had his weakness fairly under control.

I pass over other sources of error and by no means the least. My object in referring to them is not to refute the material so carefully collected, but simply to present certain critical scientific objections to the method. The investigation yields valuable results since it is well directed, and especially when the more analysable phenomena are under consideration, such as have a real existence and constitute a part of our mental life; but it becomes liable to

criticism when it takes up a subject so indefinite in itself and so far, speaking *a priori*, from our normal intellectual condition.

V.

We have given especial attention to this question, and during the six years that we have been reading the results of the inquiries of Messrs. Gurney, Myers, and Podmore, we too have been collecting a large number of observations which we shall briefly state. The conclusion of our investigations does not agree with the results of the *Society for Psychical Research*, and we shall give later on the explanation of these contradictions in the Society's conclusions, which are due, in our opinion, to ignorance of the condition of the subjects, of their natures, their education, etc., care being but rarely taken to secure truly scientific observations. Showing our facts such as they are, we are very far from assuming that truth is on our side; it is on neither side, I venture to say, for it is still in dispute. In science, as in everything else, it is necessary to compare facts, stating as minutely as possible, the conditions under which they are obtained and leaving the final criticism to the future. Far from denying the existence of a fact that seems incontrovertible even to the very best scientists, and seems the more so because it is not fundamentally impossible, we shall limit ourselves to publishing our observations. I am convinced with M. Richet, that we must not do like the mandarins, and that in science, as well as in life, our motto should always be: Face the future. But before taking a step, that step should be measured. We shall let the facts speak for us.

I now come to the second part of the problem: the apparition of persons under any sensorial excitement, undergoing some great crisis, or who are at the point of death, to some other person, a friend or a relative. As for the other part: the transmission of thought or feeling from one mind to another without the intermediary of the organs of sensation, the affirmation without being categoric has more probability. It must, however, be made very precise, and I believe that it depends largely upon psychic conditions, easily apprehended, without having recourse to transmission

TABLE I.

ORDER	NAME	SEX	AGE	PROFESSION	EDUCATION	NO. OF DETERMINATIONS MADE	NO. OF CASES IN WHICH THE SUBJECT WAS CONVINCED OF THE REALITY OF THE HALLUCINATIONS, AND OF THE COINCIDENCE	NO. OF CASES CONFIRMED EXACTLY	NO. OF ERRORS PROVEN	PERCENTAGE OF CASES CONFIRMED	NATURE OF THE HALLUCINATION				TIME COVERED BY OBSERVATIONS	REMARKS
											aud.	vis.	tac.	olf.	years	
I	A	Fem.	50	None	Elementary	112	109	6	103	5.5	35	70	5	2	9	Very pious and orthodox
II	B	"	30	"	Average	47	46	1	45	2.18	19	26	1	1	9	" " " "
III	C	"	70	Agric.	"	128	121	5	116	4.13	39	84	0	5	9	" " " "
IV	D	"	25	Teacher	University	21	21	0	21	0.	1	19	0	1	2	Free thinker, not given to analysis
V	E	"	34	None	Average	8	8	1	7	12.5	0	8	0	0	8	Very orthodox
VI	F	"	27	"	Elementary	31	31	0	31	0.	1	25	0	5	5	No fixed opinion
VII	G	"	25	"	"	14	13	0	13	0.	2	7	4	1	1	No clear opinion
VIII	J	"	23	Teacher	University	172	167	4	163	2.39	35	135	1	1	5	" " " , on the whole orthodox
IX	K	"	26	None	"	27	27	0	27	0.	0	27	0	0	8	Orthodox
X	L	"	60	"	Average	12	11	0	11	0.	0	12	0	0	9	Fervent orthodox Christian
XI	M	"	36	"	"	4	4	0	4	0.	4	0	0	0	1	Free thinker
XII	N	"	20	Domestic	Elementary	3	3	0	3	0.	0	3	0	0	1	Bigoted orthodox
XIII	O	"	56	None	None	78	78	2	76	2.05	16	30	1	31	9	Orthodox; admirable intelligence
XIV	P	Male	48	Teacher	University	26	26	1	25	3.46	4	20	1	1	3	" ; keen intelligence
XV	Q	"	61	Landlord	"	14	12	0	12	0.	0	14	0	0	6	Free thinker
XVI	R	"	31	Teacher	"	7	7	0	7	0.	7	0	0	0	½	Without clear ideas
XVII	S	"	28	Official	Average	100	93	8	85	8.6	17	80	0	3	2	Bigoted orthodox; fantastic imagination
XVIII	T	"	26	Publicist	"	81	81	10	71	12.2	9	71	0	1	3	Metaphysical mind
XIX	U	"	30	Teacher	University	7	6	0	6	0.	0	7	0	0	2	Free thinker; logical
XX	V	"	70	Agric.	Average	2	2	0	2	0.	0	2	0	0	4	Good reasoning powers
XXI	W	"	35	Teacher	"	117	115	2	113	1.74	9	100	5	3	7	Melancholy, dreamer, orthodox but critical
Total 21		13f. 8m.	38.58 (av.)			1011	981	40	941	5.47 (av.)	198	740	18	55	5. (av.)	

from a distance through the ether. Investigations made on this topic, to which we shall refer at some other time, have convinced us that the psychological side of the question is generally too much neglected, due to a readiness to enter at once upon the field of the marvellous, now supposed to have become knowable, the veil of Isis being lifted.

My observations were made upon a limited number of subjects, but I venture to say that they have a certain value because of this very fact. My subjects are distributed as follows: 21 subjects of Roumanian origin, 8 men and 13 women; 11 subjects of French origin, 8 men and 3 women. Total, 32 persons. These persons I followed up very closely, and living their common life with most of them, I was able to keep a check upon the facts, to make the record of the observation, and to observe with my own eyes. Most of these persons were far from knowing anything of modern psychological studies or anything that could influence their mode of thought. None of these subjects was aware of my investigations, except two of my colleagues who finally, after I had made a great many observations, began to suspect the attention I was giving to their hallucinations. None of the facts observed has been accepted upon hearsay. Those will form a category by themselves, and we shall not enter into details regarding it, especially since the results agree.

Table I., on the opposite page, gives a complete account of our experiments; all the details have been noted with a purpose, each having in our estimation a special value.

TABLE II.

Number of subjects	21, women 13, men 8.
Number of determinations	1011.
Number of coincidences claimed by the subjects	981.
Number of exact coincidences	40.
Number of errors proven	941.
Number of true cases reported, per cent	5.47.
Number of visual hallucinations	740.
Number of auditory hallucinations	198.
Number of tactile hallucinations	18.
Number of olfactory hallucinations	55.

TABLE III.

ORDER	NAME	SEX	AGE	PROFESSION	EDUCATION	NUMBER OF DETERMINATIONS	NUMBER OF TIMES SUBJECT WAS CONVINCED OF COINCIDENCE	NUMBER OF EXACT COINCIDENCES	NUMBER OF CASES AT SECOND HAND	NUMBER OF ERRORS FOUND	PER CENT. OF TRUE CASES	NATURE OF THE HALLUCINATION				TIME COVERED BY THE OBSERVATIONS	REMARKS
												aud.	vis.	tac.	olf.		
I	A′	Fem.	45	None	Average	36	33	1	0	32	3.3	14	20	2	0	3 yrs. 9 m.	No fixed opinion; very suggestible
II	B′	"	36	Teacher	"	21	19	0	5	19	0.	3	15	1	2	4 "	Fantastic imagination; spinster
III	C′	"	29	Artist	"	43	43	3	8	40	6.97	12	24	5	2	7 " 2 "	No general ideas; commonplace view of life
IV	D′	"	47	Publicist	University	19	18	0	0	18	0.	1	18	0	0	4 " 4 "	Distinct type; loves marvels; neurasthenic
V	E′	"	32	Landlord	Average	26	26	2	7	24	7.69	3	19	1	3	6 "	Orthodox; inclined to mysticism
VI	F′	Male	26	Student	University	81	79	1	10	78	1.26	26	50	3	2	5 " 1 "	Free-thinker; metaphysician; dreamer
VII	G′	"	28	Teacher	"	35	30	0	8	30	0.	15	19	1	0	3 " 9 "	Critical yet mystical; few ideas
VIII	H′	"	32	Overseer	Average	24	23	0	2	23	0.	3	12	7	2	2 " 11 "	Keen intelligence, but no dominant idea
IX	I′	"	49	Agricul.	Elementary	36	35	1	11	34	2.85	4	27	0	5	4 " 6 "	Orthodox; leaning toward occultism
X	J′	"	60	Landlord	"	8	8	0	1	8	0.	0	8	0	0	4 "	Confused mind; no data about life and nature
XI	K′	"	37	Literateur	University	9	7	0	0	7	0.	5	2	0	2	3 "	No scientific culture; dreamer
XII	L′	"	31	"	"	15	13	0	2	13	0.	6	8	1	0	3 "	Fatalistic; free-thinker
XIII	M′	"	39	Publicist	"	10	10	0	2	10	0.	8	0	1	1	3 " 7 "	Good head; a thinker
13		fem. 5 male 8	37.66 (av.)			363	344	8	56	336	4.36 (av.)	100	222	22	19	4 " 3 " average	

Table II. sums up the chief conclusions and contains the averages of the results. The age of these 21 subjects varies from 23 to 70 years, averaging for the women 37 years, for the men 41 years.

It must be added that the occupations of the subjects were distributed as follows: 9 women without occupation, 1 agriculturist, 2 teachers, 1 domestic; 4 men were teachers, 1 officer, 1 publicist, 1 agriculturist, 1 landlord. As for their education, it stood as follows: 4 elementary education, 9 moderate education, 7 university education, 1 lacking education.

Table III. gives account of observations made upon French subjects, and in Table IV. the general results are summed up.

The general averages contained in Table IV. harmonise with those of Table II., although it deals with subjects belonging to a different environment and having a totally different training and education. The number and the nature of the sensorial hallucinations corresponds to the total number of determinations.

TABLE IV.

Number of subjects	13; females 5, males 8
Number of determinations	363
Number of coincidences alleged by the subjects	344
Number of coincidences established	8
Number of errors demonstrated	336
Percentage of true cases	4.36
Number of visual hallucinations	222
Number of auditory hallucinations	100
Number of tactile hallucinations	22
Number of olfactory hallucinations	19

The coefficient of percentage of true cases becomes still more inconsiderable if it is based on the total number of cases, instead of taking the average: 1.68 instead of 4.36. Of the true hallucinations, those in which there was any sort of coincidence, 5 were visual, 2 auditory, 1 tactile and 1 olfactory; 3 before and the remainder after the actual occurrence.

The total number of our observations was 1374, made upon 34 subjects, 1325 of them being presented by the subjects themselves as affirmative, while 48 were established as coincidences occurring

within from 6 to 60 hours of the actual event, and 1277 cases established as errors. The visual hallucinations numbered 962, and the others in the order of their determination: auditory, 298; olfactory, 74; tactile, 40. The coefficient of percentage of true cases yields a general average of 5.10, but if it is based on the total number of cases it is only 2.25.

VI.

Let us recall in a few words the manner in which we have collected this evidence; we insist on the value of the facts that we are publishing, and consequently, as in any biologic science whatever, that the method is the first consideration that ought to receive the attention of the experimenter. In order to make ourselves better understood, we shall take as an example case XIII., Table I., Madame N., without profession, aged 56 years.

We know Mme. N. intimately; much of our life was spent near her. During vacations we were in the country, and I spent long days beside her, working at my desk, and she sat embroidering or spinning huge distaffs of wool. From time to time she interrupted her work, we talked together, and she told me her thoughts and the ideas she was following while spinning. At times she stopped suddenly, the spindle fell from her belt, and sadly, with rigid features, she explained to me in figurative language that she had had a distinct vision of her husband, sick, suffering, and sometimes dying. It seems to me that I still see her as I write these lines, melancholy, analysing with remarkable intelligence her own mental condition, announcing to me an inevitable misfortune; then calm and collected at her spinning again, after sighing deeply a few times, and never forgetting to make the sign of the cross. While sympathising with her distress, the psychologist was always ready to note the case; one more piece of evidence, and after having written down the words almost from dictation, and noted the hour, the attitude, and my own impression, I carefully sought to ascertain whether there had been any connexion between the subject and the object of the hallucination.

And curiously enough, the testimony of the person that was

the object of the hallucination was inadequate, and whenever conversation turned upon it, or he was questioned by the person that had experienced the hallucination, the two nearly always came to an agreement, were it only with the corroboration that he had felt a deep moral suffering. The psychologic life of man is a tissue of lies, of illusions, of false perceptions, of beliefs, ideas and judgments seldom co-ordinated upon any fixed, well defined plan. Suggestions are readily received, and sometimes, if not always, under the influence of a tender word, of an emotion delicately whispered, the memory becomes blunted, the judgment more superficial, and the little analysis of which one is capable is lost. Very frequently the testimony of persons, whether learned or totally lacking academic education, was wholly inadequate to substantiate a fact. In the majority of cases self-analysis is poor, and then they forget so quickly, especially when they are not interested, as we psychologists are, in the mechanism of their feelings and actions. So then, after several disappointing corroborations, I always examined the social and psychic conditions of the persons under consideration.

We possess 78 telepathic hallucinations of Mme. N., which we witnessed or which were reported to us. In all of them Mme. N. had believed with absolute confidence, and those about her, fairly educated men, regarded her affirmations as veracious. Of course, as time went on the hallucination assumed a greater degree of verity, and was finally portrayed with a legendary halo that seemed, however, strictly correct to those about her, people acting in good faith and capable of testifying with their hands upon the cross, that every word, every detail of the story told by Mme. N. was correct. And yet out of the 78 hallucinations, 76 errors were proven, and only in 2 cases was there any agreement whatever, and the conditions and the cases as we were able to establish them are as follows:

First: The husband of Mme. N. had to go on important business to a town 25 kilometers distant from his home in the country, and he was obliged to employ the services of a drunken coachman. Mme. N. was very uneasy, but as the business was important, she consented that the man should drive the carriage, after she had

roundly lectured him. It was a day near the end of March and we were in the country with Mme. N. As was customary she took her distaff, arranged the winder for a servant, and began to spin quite happily. The wind was whistling boisterously outside, and, as it had rained for several days before, there had been tremendous inundations in the country. M. N., her husband, had to ford a considerable river on this journey. Three hours had passed since his departure ; Mme. N. with tears in her eyes told me that she seemed to hear the voice of her husband groaning. The sighing of the wind seemed to her to be the cause of this queer sensation. Late at night M. N. was brought to the house, half-fainting, with a fracture of the right leg. As he was about to cross the river on his return, after it had begun to grow dark, the driver having become drunk again in the town, the horses would not go into the water but ran away with the carriage across the fields. M. N. tried to jump, but his foot was caught in the wheel and he had fallen to the ground nearly dead. This happened toward 8 o'clock in the evening, and Mme. N. had had her hallucination at about 11:36 in the forenoon. So there had been a difference of about 8 hours between the hallucination and the reality, and strangely enough the hallucination preceded the unfortunate occurrence.

Second: I now give the second case in connexion with Mme. N., which I had the good fortune to observe under the following conditions: I was with Mme. N. at the city of B. and we were walking peacefully in a little garden of fruit trees toward the evening of a summer day. We were talking of her daughter, Mme. M., who was in the country with her husband, and whom at the time of her last meeting she had found somewhat ill, weak, and sad. In the city where we were there was an epidemic of typhoid fever, and already a considerable number of deaths had been reported. That evening at table Mme. N. told us that at the moment when she was about to eat her soup she had experienced a distinct vision of her daughter at the point of death, wrapped in white cloths and just about to render up her spirit. Two days later we received a letter from the husband of the daughter, announcing in fact that the daughter was seriously ill with typhoid fever, and that the phy-

sicians who had seen her some hours before the letter was mailed (3 hours, as we were informed) and who had watched her the whole morning three days before, from 3 till 5, gave no assurances of her recovery. Here was a vague coincidence, for the hallucination had occurred 15 hours after the existence of the typhoid crisis this time. Yet this fact did not prevent everybody from citing this case as verified. In this sort of hallucinations the marvellous seizes so promptly upon human thought that one forgets quickly the conditions under which it took place and even neglects to note whether it took place before or after the event, and whether 10 hours or 10 days after.

If these two cases had been collected by the usual method of psychological investigation, attention would certainly have been called to them, and I know even men with a university education who would have noted them in their memorandum as verified facts. Witnesses were not wanting to confirm the reality of the coincidence. Officials, magistrates, peasants, and university men are always ready to agree on anything that involves the marvellous. Never undertake to convince these sincere and honest witnesses of the truth of the facts, for you will not succeed, and besides you will lose the chance of observing the genesis of legends and especially of the senseless logic which pervades the judgments and the feelings of men.

For my part, this coincidence appears explicable on a purely psychologic hypothesis, but I will not insist upon it here, for I shall take it up again at the close. There is a considerable sub-conscious process which forces the subject to direct his thought upon the health of the one who is absent, and by an easily understood process the apprehension of misfortune or of death quickly insinuates itself, and all the more if it is supported by critical situations of which it may have knowledge, such as the critical condition of the coachman and the inundations in the first case, and the epidemic of typhoid fever and the knowledge of the ailing condition of Mme. N.'s daughter in the second case.

VII.

It would be impossible to give all my observations, and to report the details of my evidence would require the whole of a volume with at least the dimensions of the investigations of the London Society for Psychical Research. We shall be satisfied with a sketch of the general results.

We have lived in close contact with a great part of our subjects both French and Roumanian; they are friends, relatives, or people with whom we sustained most cordial relations. I emphasise this fact, for I believe that an off-hand observation without any intimate knowledge of the person observed is altogether without value. Only on this condition of having a thorough knowledge of the person who relates his telepathic hallucinations or his pathological romance can the observation be regarded as scientific. In psychological investigations, and what is still more lamentable in mental and nervous pathology, this fact is unfortunately not taken into account. In this connexion I cannot neglect to express my admiration for my master, P. Janet, on account of the emphasis which he lays, and always recommends others to lay, upon the prolonged and patient study of a subject whether normal or pathological. The observations that I have had occasion to make on the subject of telepathy have taught me the value of this thorough verification, and when I read over my notes on the condition of my subjects and their private life I believe that I can succeed, thanks to them, in explaining the genesis and the meaning of their telepathic sensorial hallucinations.

Living beside them, aided by that important biological factor, chance, throughout the nine years during which I have pursued my observations and investigations in telepathy, I have been able on the one hand to grasp the hallucination in its entirety, and on the other to test and verify its basis of truth or error. Often I have been able in the case of my French friends to catch their hallucinations in the midst of an evening of labor, upon a promenade, or during a visit to the laboratory. Afterwards I endeavored to test the

fact by means of letters or by personal verification. Here I ought to confess that for certain cases of my French subjects the verification was made indirectly and to a certain extent under the direction of the subject, when we were dealing with persons whom we did not know at all and who lived part of the time in the colonies and part in foreign countries, but during the most of their cases lived in Paris or at least in France.

The observations upon French subjects have a capital importance for us, for they demonstrate that the telepathic hallucinations collected by us do not depend exclusively upon any influence of environment or of country. They prove once more that the psychic mechanism of man is about the same everywhere, and that the similarity is the greater when we approach the questions of transcendental metaphysics and the burning questions of death and immortality. I have had the opportunity of making observations in this line upon 3 Germans, 2 Italians, and 4 Spaniards, and while I was unable to apply the rigorous tests which I usually employ, I was enabled to confirm the truth of the paradox which we propounded a few lines above. The apprehension of misfortune and of death, and in general whatever borders on the miraculous, gains credence rapidly, and even choice intellects accept a commonplace narrative as gospel truth.

The acquaintance with the subject is important and even necessary, for in the first place it places checks at our disposal, and in the second place it puts us in the way of explaining the telepathic hallucinations.

As for the matter of proper checks, there is the great difficulty of connexion and relation which only psychologic common sense and the tact of the experimenter can evade or overcome. It is necessary in the first place to take care that the checks be applied promptly instead of allowing long weeks to pass between the steps of verification, for the subject and the object usually end by agreeing in their statements. Differences of days become hours, and hours scarcely lasted minutes! And this is true for all classes of subjects, for there is an interesting nostalgia to be studied in this love of the marvellous in the multitude. Therefore we must have

a system of checks applied promptly, skilfully, and with the greatest prudence. While self-esteem is in general ill-balanced, certainly among women, it becomes more irritable and more irascible in connexion with questions of the marvellous. A blind credulity meets a story told by any gentleman or lady whatever, provided it be well told and have something of the mysterious in its content!

The hallucinations observed by us have been sensorially of four varieties: visual, auditory, tactile, and olfactory; the most numerous, if only table I. be examined, are the visual, 740, and the others follow in their order: auditory hallucinations, 198; olfactory, 55; and lastly tactile, 18. The clearest of all and accompanied by the most details in their content were, in the opinion of all the subjects, the visual hallucinations, and after them the auditory. The person was seen in agony, with a sad countenance, a wound in the hand, his heart pierced by assassins, his legs broken, etc., or perhaps asking for help: he was seen speaking but the words not heard,—an interesting hallucination which so far as we know has not been pointed out by any one before. Among the auditory hallucinations we have verified: voices calling for help, incoherent words barely whispered, cries, counsels, words of tenderness uttered mournfully, musical airs generally in a melancholy strain, etc.

The olfactory telepathic hallucinations consist of olfactory sensations of gunpowder, the odor of the person, the odor of a corpse, an odor characteristic of the house in which the subject was, a favorite perfume, the taste of ether and the taste of chloroform, etc., associated in many cases with other hallucinations, yet having nevertheless this predominant feature. Of the 55 cases collected in Table I. we found 39 pure olfactory hallucinations which were not associated with any other sensorial telepathic hallucination. Gustatory hallucinations are rare: we have met them in 2 cases in 2 French subjects who are not represented in the tables, and which were accompanied by a number of other sensations. The first of the persons in question had the sensation of having a drop of poison on his tongue, the same poison (morphine) that the person at a distance, who was at the point of death, had taken in order to

express by the drop of poison his hopeless condition. In the second case the subject experienced the sensation of thirst, accompanied by the sight of blood. The tactile hallucinations generally consisted of the sensation of touch, of cold sensations in the back, of chills, of kisses, a slight passing breeze, something floating which warned the subject of the existence of some peril, the pressure of a hand, the feeling that some one is looking at your back, or is seizing you by the shoulders, etc.

Tables V., VI., VII., and VIII. contain the classification in the order of their numerical importance of all these different sensations, which are interesting enough to be catalogued.

TABLE V.

SENSUAL TELEPATHIC HALLUCINATIONS.

QUALITY AND NATURE OF THE HALLUCINATION.	NUMBER OF CASES OF THIS HALLUCINATION FROM TABLE I.
I. Persons seen in agony in various forms	178
II. Persons seen with sad and rigid features	4
III. Persons seen walking, sad and pensive	10
IV. Persons seen at distance, sad and questioning look, face as of one dying	69
V. Persons seen at distance, with wound on hand, heart, or face	100
VI. Persons assassinated	21
VII. Persons seen crushed by a wagon, drowned, killed, strangled, etc.	160
VIII. Persons seen asking help with gestures, and struggling	78
IX. Persons seen speaking, but the words not heard	29
X. The head only seen, detached and shadowy, or some other organ detached but in a significant attitude	10
XI. The persons seen dead in a coffin	81

In this table we have only summed up the general lines, omitting all the details, each of these 11 classes that we have made up having numerous subdivisions. It is to be noticed that the most numerous cases belong to the state of agony (178) in its manifold forms; the least numerous are the telepathic hallucinations in

which only a detached head was seen like a shadow against a bright background, or merely a separate organ in a significant attitude. The sensations of class IX., when the object was seen speaking, and the sense of the words was understood by the movement of the lips and of the mouth, without having the sound of the words, were relatively numerous: 29. The subject claims that he hears nothing: "I know that he is threatened by a misfortune," said one of them to me, "for the words that he pronounced inform me of his condition." In another case a subject remarked that he saw a mute speaking.

The same observations apply to the auditory, tactile and other telepathic hallucinations; our groups represent types and each contains classes more or less similar.

TABLE VI.

AUDITORY TELEPATHIC HALLUCINATIONS.

NATURE AND QUALITY OF THE HALLUCINATION	NUMBER OF CASES IN TABLE I.
I. Voice heard asking help under strange conditions ...	30
II. Incoherent words stammered by one dying.....	17
III. Words barely whispered in the ear, suggesting a being in distress	25
IV. Cries of terror and despair.....	29
V. Sweet and tender words spoken in a melancholy tone	6
VI. Music and song in sad strain.....	27
VII. Tender reproaches in a familiar but altered voice...	9
VIII. Vague sounds; strange voices.....	19
IX. Sighs accompanied by words and groans.....	11
X. Intimate and tender memories roused by beloved voice of one absent, mingled with reproaches.....	12
XI. Counsels on conduct of life given by those dying....	7
XII. Spasms, convulsions, sufferings, painful dreams, sad	6

It is to be observed that the most numerous hallucinations are those of classes I., III., IV. and VI.: words asking help, words barely whispered, song heard in melancholy strain, cries of despair, etc., sensations which suggest in a general way the *tonus affectif*, as the Germans would say. It is to be noted that in the two classes

of cases we find the same relative proportion of the classes of hallucinations.

TABLE VII.

HALLUCINATIONS BOTH TACTILE AND TACTILE-MUSCULAR.

NATURE AND QUALITY OF THE HALLUCINATION	NUMBER OF CASES IN TABLE I.
I. Kisses and customary caresses	2
II. A light wind passing	1
III. A floating object, warning the subject of a misfortune; vague and indescribable condition	2
IV. Familiar pressure of the hand	1
V. Familiar gesture	5
VI. Feeling that some one is looking at you from behind and touching you	1
VII. Sensation as of some one seizing you by the arm	4
VIII. Sensation of heat, cold, effort, oppression, etc	2

The most numerous are the hallucinations consisting of a familiar gesture, and those of class VII., those of contact or of some one seizing you by the arm.

TABLE VIII.

OLFACTORY TELEPATHIC HALLUCINATIONS.

NATURE AND QUALITY OF THE HALLUCINATION	NUMBER OF CASES IN TABLE I.
I. The peculiar odor of the person, suggesting distress, agony, suffering	21
II. The smell of a church; chrysanthemums and funeral flowers	9
III. The smell of a corpse; of something decaying, of blood	5
IV. Odor familiar to the subject	4
V. Favorite perfume, artificial odor	3
VI. Taste of drugs, ether, chloroform, medicines	8
VII. Indescribable perfumes mingled, suggesting impending grief and misfortune	5

I reserve the right to publish sometime all these curious records of telepathic hallucinations. The regret that I cannot bring

them out now comes back in treating of the olfactory hallucinations. Here there is an interesting domain to be made known, especially in regard to what the subjects call the "personal odor." The hallucination coming in the olfactory form suggests the reality of the person. "It is as if he existed," said one subject to me. "He is beside me, I perceive him by the peculiar odor emitted." "Why is this perfume of iris present in the air, with that sweet fragrance that Mme. X. exhales?" said another. "Every breath makes me think of her; by the perfume, and it is her favorite perfume, it is surely she." And this odor or some other fills the atmosphere in which the subject experiences the hallucination, suggesting a peculiar psychic condition of the distant or absent person, mostly a state of suffering, of sorrow, of a painful situation. Of what this peculiar personal odor consists is not to be discussed here; let us be satisfied to say that it exists and that it plays an important part in social life and the realm of the senses.

These hallucinations are mostly accompanied by other associated hallucinations; we have taken into account only the initial impact, the first hallucination, which suggested a whole series of mental activities; in other words, the sensation which had evoked any mental effort whatever. There were, very rarely, different sensorial hallucinations occurring at the same time: an auditory hallucination concurring with a visual one.

Our observations corroborate the predominance of visual hallucinations, a fact moreover clearly brought out by the inquiries of the London Society for Psychical Research.[1] The explanation given by Messrs. Gurney, Myers and Podmore as the true cause of this predominance, emphasising the distance covered by the excitation between the higher ideational centers and the sensorial centers, is a mere hypothesis that has no other quality than its ingenuity. In our opinion the cause is simply due to the fact that most men are dependent on the sense of sight, and that hallucinations are included only within the compass of subjective intellectual phenomena.

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[1] *Op. cit.*, p. 222 and *passim*.

Of these 40 cases in which there was a real agreement, there were 21 visual hallucinations, 10 auditory, 4 tactile, and 5 olfactory, and the time covered by them varied between 6 and 60 hours; and 19 took place before the actual occurrence, and 21 after the existence of the fact that might have occasioned the telepathic hallucination. Let us repeat once more that the predominance is on the side of the visual hallucinations.

[TO BE CONCLUDED.]

N. VASCHIDE.

PARIS.

BOOK REVIEWS.

La méthode dans les sciences expérimentales. Par *Louis Favre*. Paris: Schleicher Frères. 1898. Pages, xxv, 470. Price, 5 francs.

L'organisation de la science. Cours libre professé a La Sorbonne. Par *Louis Favre*. Paris: Schleicher Frères. 1900. Pages, ix, 409.

From the prospectus and the general spirit and contents of its first two volumes, the present series of works devoted to the critical discussion and systematic exposition of the methods which obtain in the experimental sciences, bids fair to be a sound and serviceable contribution to semi-philosophical literature. Volumes have been announced on methods in agronomy, in sociology, psychology, and economy, in zoölogy, botany, and mineralogy, a work on the elements of physics, and another on the philosophy of the sciences. It has been the intention of the editor of the series, M. Louis Favre, to contribute to the advancement of the experimental sciences by placing at the disposal of investigators, particularly young investigators, the methods which are absolutely requisite for progress. In any discovered fact there are two features to be observed, the discovered fact itself, which belongs to the past of science, and the *method* which serves for its discovery, which forms part of the future of science. The fact passes away; the fact is the fruit which has but the life of a day. But the method employed to produce the fruit, the method which has caused the seeds of truth to bear the fruit,—this is the permanent product, which abides forever and which claims the highest and noblest attention of the man of science. Now, there are two modes of expounding science, that which is devoted principally to the exposition of the discovered facts, which is naturally the method of elementary instruction, and that which is devoted principally to expounding the methods which have enabled us in the past and will also enable us in the future, to discover facts and relations of facts, and which naturally belongs to advanced instruction. It is this second mode of exposition that is to be employed exclusively in the series of works here announced, which will treat of every experimental science now existing or ever destined to take rank as such, not excluding the industrial and æsthetic arts.

The single facts of nature, according to M. Favre, have not a distinctive and particular essence of their own; each, on the contrary, has its necessary and char-

acteristic relations and resemblances with other facts. Facts are, if we so wish to phrase it, of different species, but these different species admit of classification into genera, embracing related species, and frequently even into still more extensive groups. Now, to show how in any one given case some stubborn fact has been attacked, to show by what methods the difficulties which it presented have been conquered, is tantamount to showing how it is possible, by slight modifications of the procedure employed in the original case, to conquer similar difficulties belonging to the same genus but differing only with regard to species. It is to be shown, in the case of each method, what is essential, also what is general, what admits of universal application. The mechanism of each method is to be dissected, so that the reader may clearly see for what purpose each of the principal parts is designed; and, after seeing for what purpose it has been employed, to be able to determine for what purpose it may be employed in the future. In science, in the combat against ignorance and error, a method is not a tool which wears out or loses its edge by usage; on the contrary, it grows constantly more fit for its purpose, and increases in keenness the more it is employed, always acquiring new strength from every new usage.

In the first volume of the series, entitled *Method in the Experimental Sciences*, M. Favre has considered the nature of hypotheses, explanation by analogy, explanation by comparison, cause and effect, experiments, instruments, etc. He has some good remarks to make on classical errors, on the impossible problems of science, scientific prejudices, scientific paganism and heredity, on the power of words, etc. It would lead us too far to enter exhaustively into this theory of explanation. It may be indicated briefly only. A proposition, he says, explains a fact when, starting from the data contained in the proposition, the fact can be rigorously deduced from it. Conditions (the presence and mutual action of determinate quantities of energy, matter, and ether) explain a fact when, starting from the conditions as given, the fact can be rigorously deduced. The ideal type of scientific explanation is dynamic explanation, which, having two angular components given, enables us to deduce a resultant. The most general form of the problem of explanation in the experimental sciences is, having given a phenomenon as result, to determine the conditions which produced it. The composition of forces, motions, etc., is the general ideal type. The form in which every scientific explanation (hypothesis or explanatory theory) should be announced is the following: 'Things (as actually known and studied) take place *as if* such and such conditions were the cause of the phenomena observed." Thus, "things take place in nature *as if* there were *energy*, *substance* (matter and ether), and *laws* for regulating the relations between energy and substance." "Things take place *as if* 'centrifugal force' really existed." "Things take place *as if* 'imaginary quantities' existed." "Things take place," to revert to some antiquated views, "*as if* nature had a horror of a vacuum, *as if* caloric existed," etc., etc. While one may have criticisms to make of the shadowy and dualistic form which the theory of explana-

tion may sometimes assume on this doctrine, one must certainly say that the remarks of M. Favre are in many instances elucidative and that they agree in the main with the current views of the philosophy of science.

In his second volume, M. Favre outlines for the various experimental sciences (applied mechanics, physics, chemistry, biology, etc.) the plan of organisation which he deems desirable, by distinguishing in the case of each science, first the organisation of its component parts, and secondly the organisation of labor of its workers. He lays much stress upon the importance of adopting for each science commonly accepted definitions, common classifications, nomenclatures, etc., and for physics he has especially given what he deems to be a convenient and logical plan for the study of that science. *μ.*

A Student's History of Philosophy. By *Arthur Kenyon Rogers, Ph. D.*, Professor of Philosophy in Butler College. New York: The Macmillan Company. 1901. Pages, xi, 519. Price, $2.00.

Of the making of histories of philosophy there seems to be no end, but the present attempt of Dr. Rogers, from its readableness and simplicity, is deserving of a cordial reception. His method has been selective, and it has been his aim to attain economy and clearness of presentation as distinguished from detailed comprehensiveness, at least so far as that has been possible, "without losing sight of the real meaning of philosophical problems." In summing up the thoughts of individual philosophers, he has neglected the minor points of their teachings, and primarily endeavored to emphasise the "spirit" in which they philosophise and the main problems in connexion with which they have made their impression on the development of human thought. Minor names have been passed over. The Mediæval period, while admitted to be intrinsically of great importance, is awarded only 60 pages out of the 500 and more that constitute the volume. A book with this selective purpose Dr. Rogers believes has its place alongside such a volume as Weber's, although he seems to forget that the actual reading space which his work occupies is nearly, if not exactly, as great as that of Weber's. The bulk of the volume has been increased slightly by verbatim quotations from the great philosophical writers, particularly in places where the literary interest supplements the philosophical. This has been especially the case with the Greek philosophers, and has undoubtedly helped to swell the volume. This has its good side, however, and the author hopes by it to arouse "an interest in the masterpieces of philosophy at first hand," a hope which we sincerely trust will be fulfilled. Greek philosophy to Philo occupies 181 pages. The Religious Period, so called, occupies 27 pages; modern philosophy, 250 pages; philosophy since Hegel receives brief, one might even say composite, treatment, but is none the less distinct and intelligible on that account. Recent philosophy is indicated merely in its general tendencies.

The work is unhampered by unnecessary footnotes and references, though there are good general bibliographies; and while the space devoted to some phi-

losophers may to many minds seem disproportionate, Dr. Rogers's exposition of the broad outlines of development of philosophic thought is, upon the whole, continuous, organic, and symmetrical. The student cannot fail to carry away from the perusal of this work, which he will find a pleasant task, a distinct and lasting impression of the main features and the general trend of the growth of the great ideas that have moulded human thought and ofttimes human destiny.

T. J. McC.

AN INTRODUCTION TO PSYCHOLOGY. By *Mary Whiton Calkins*, Professor of Philosophy and Psychology in Wellesley College. New York: The Macmillan Company. 1901. Pages, xv, 509. Price, $4.00.

The present introduction to psychology by Professor Calkins is intended primarily for the convenience of her students at Wellesley College. "The book is written in the conviction that psychology should study consciousness, both as a series of complex mental processes, or ideas, and as a relation of conscious selves to each other. It is hoped, however, that the points of view have been so carefully distinguished that the book may be useful to readers who reject one or other of these underlying conceptions." The two fundamental theories of the book: (1) the existence of elements of consciousness which are neither sensational nor affective, and (2) the conception of psychology as a science of related selves, are acknowledged by the author as essentially identical with the teachings of Professor James and Professor Münsterberg, from which two psychologists much of the material and the inspiration of the work has been derived. The book is intended for students beginning the study of psychology, although the references to psychological literature and "the formulations of conflicting theories" are sufficient to enable the student to enter independently on a thorough and continuous study of introspective psychology. In the appendix considerable matter has been added on special subjects for the use of more advanced students. The greater part of the book is devoted to the study of normal introspective psychology or the study of the normal civilised and adult consciousness,—on the theory that a thorough analysis of the "facts of one's own normal experience is the necessary introduction both to the introspective study of one's own abnormal experience and to the comparative study of the consciousness of other human beings." Miss Calkins's method and trend of treatment may be gathered from the following titles selected from her chapter headings: Structural Elements of Consciousness; Auditory Sensations; Sensations of Taste and of Smell; Sensations of Pressure, of Pain and of Temperature; Sensations from Internal Excitation and the Consciousness of Motion; The Consciousness of Extensity; Sensational Element and Sensation; Attributive Elements of Consciousness; Relational Elements of Consciousness; Attention; Concrete Conscious Experiences; Fusion and Association; Perception; Imagination; Memory; Thought: Generalisation; Thought: Judgment and Reasoning; Recognition; Emotion; Volition and Belief; Will and Faith; Typical Personal Rela-

tions; The Religious Consciousness; The Social Consciousness; Divisions of Psychology; The Psychology of the Animal Consciousness; The Psychology of the Child's Consciousness; Abnormal Conscious States of Persons in Health; The History of Psychological Systems.

The style of the book is simple; the material presented in it, rich; and the treatment, competent. It will be a very serviceable work to many students.

LAMARCK THE FOUNDER OF EVOLUTION. HIS LIFE AND WORK. With Translations of his Writings on Organic Evolution. By *Alpheus S. Packard*, M. D., LL. D., Professor of Zoölogy and Geology in Brown University. New York: Longmans, Green & Co. 1901. Pages, xii, 451.

It is long since we have met so interesting a work of scientific biography as this life of Lamarck by Professor Packard. The importance and variety of Lamarck's work, his interesting personality and career, his biographical and historical environment, have all been charmingly depicted, and go to make up a portraiture which has seldom been excelled. "The name of Lamarck," says Professor Packard, "has been familiar to me from my youth up. When a boy, I used to arrange my collection of shells by the Lamarckian system, which had replaced the old Linnean classification. For over thirty years the Lamarckian factors of evolution have seemed to me to afford the foundation on which natural selection rests, to be the primary and efficient causes of organic change, and thus to account for the origin of variations, which Darwin himself assumed as the starting-point or basis of his selection theory. It is not lessening the value of Darwin's labors, to recognise the originality of Lamarck's views, the vigor with which he asserted their truth, and the heroic manner in which, against adverse and contemptuous criticism, to his dying day he clung to them."

Professor Packard has spent considerable time in Paris, gathering materials for his biography; he has visited the place of Lamarck's birth, examined the records of his family and connexions, and has studied all the accessible sources with enthusiasm. Portraits of Lamarck from old engravings, pictures of his birth-place and place of burial, reproductions of facsimiles of his hand-writing, with other illustrative material, adorn the work. A bibliography of the writings of Lamarck has also been added.

The Lamarckian theory of organic evolution has, through the labors of recent evolutionists and paleontologists, become a formidable rival of Darwinism, and as Professor Packard remarks, the prevalence of his "views in the United States, Germany, England, and especially in France, where its author is justly regarded as the real founder of organic evolution, has invested his name with a new interest, and led to a desire to learn some of the details of his life and work, and of his theory as he unfolded it in 1800 and subsequent years, and finally expounded it in 1809." The time, therefore, in Professor Packard's opinion, seems ripe for an extended sketch of Lamarck and his theory as well as of his work as a philosophical

biologist; and the translations of the writings of Lamarck, hitherto largely inaccessible, which Professor Packard has incorporated into the present volume, will go far towards reinstating the French inquirer into the rights of which for many years he was unjustly deprived. A considerable part of the translations of Lamarck's views on the evolution of man, morals, and the relation of science to religion, published in the present volume, appeared in *The Monist* for October, 1900. *μ.*

GESCHICHTE DER NEUEREN DEUTSCHEN PSYCHOLOGIE. Von *Max Dessoir*. Zweite völlig umgearbeitete Auflage. Zweiter Halbband. Berlin: Verlag von Carl Duncker. 1902. Pages, xv, 269. Price, 6 marks.

The present volume is the second installment of the second edition of Vol. I. of Prof. Max Dessoir's comprehensive *History of Modern German Psychology*. Professor Dessoir has divided the development of German psychology into the following periods: (1) From Leibnitz to the middle of the eighteenth century (the period of the founding of German psychology); (2) From 1750 to 1800 (the period of industrious encyclopædic research); (3) From 1800 to 1850 (the period of the dominance of speculation); and (4) From 1850 to the present time (the period of the upgrowth of the spirit of critical scientific inquiry). The first two periods are treated in the first volume of his work, (1) biographically and (2) technically; for it has been not only the author's purpose to exhibit the evolution of psychological thought and processes as purely objective products, but also to portray the historical and cultural background out of which German psychology has sprung, and from which the determining factors of the individual views of life have arisen. It is unnecessary to say that this task has been well and faithfully done.

The first volume, in its present second edition, has been considerably amplified. The author has gone more into detail than he did in the first edition, (continued work with the sources revealing much that was new to him,) so that the volume has now attained proportions which impart to it the value of a book of references and of sources, as well as that of a book of historical exposition,—a feature which has been enhanced by the addition of exhaustive indices.

Professor Dessoir hopes to be able to publish his second volume within four years.

THE WORLD AND THE INDIVIDUAL. Gifford Lectures. Second Series. Nature, Man, and the Moral Order. By *Josiah Royce, Ph. D., LL. D.*, Professor of the History of Philosophy in Harvard University. New York: The Macmillan Company. 1901. Pages, xvii, 480. Price, $2.25.

The discussions of the present volume form the second and concluding series of Dr. Royce's Gifford Lectures, delivered before the University of Aberdeen in January, 1900. The delay in their publication has been due to the careful revision, almost amounting to rewriting, to which Dr. Royce's expositions have been subjected. The reason for this was that while the first series of Dr. Royce's lec-

tures was devoted to the *single* problem of the Conception of Being, which dominated the entire discussion, in the present series the discussions have been entangled by the complicated relations of the Theory of Being "to various problems of empirical research and to the demands of our ethical consciousness." The scope of this closing volume includes, in Dr. Royce's own words, "a sketch of an idealistic Theory of Human Knowledge, an outline of a Philosophy of Nature, a doctrine about the Self, a discussion of the origin and destiny of the Human Individual, a summary consideration of the world as a Moral Order, a study of the Problem of Evil, and, finally, an estimate of all these views in the light of what seem to me to be the interests of Natural Religion;" "a large and manifold program," as Dr. Royce justly remarks, but one which was nevertheless required of him by his interpretation of his task as Gifford lecturer.

Dr. Royce has given us in his preface the personal history of the development of his metaphysical views and of their correlation with those of several of his colleagues. He has laid great stress upon the individual nature of his results, claiming that he has tried to give "not a perfunctory defence of the faith, and not a mere repetition of the common tradition of modern Idealism, but the expression of an individual experience of the problems at issue." He says modestly: "I do not want to make mere disciples; but I hope that I have helped some fellow-students toward a clearer knowledge of God and of themselves. Such knowledge, however, they can never get by merely accepting my views. They must use their own labor." And the labor required to read and digest a work of the profound and ultra-metaphysical character of Professor Royce's, will certainly contribute much to the attainment of that knowledge.

ALLGEMEINE AESTHETIK. Von Dr. Phil. *Jonas Cohn*, Privatdocenten an der Universität zu Freiburg i. B. Leipzig: Wilhelm Engelmann. 1901. Pages, x, 293. Price, 7 Marks.

It has been the purpose of Dr. Cohn to develop a system of æsthetics conceived as a purely critical, systematic, and philosophical science. His point of view is ultimately the Kantian, which seeks to make æsthetics an independent philosophical discipline and to define its boundaries exactly. According to Dr. Cohn, Kant was not entirely successful in establishing the exact nature of the contents of the science, nor even its precise significance. This was accomplished in a measure by the labors of subsequent German æstheticians, from Schiller to Hegel and F. Th. Vischer, although the critical equilibrium which distinguished the Kantian school was sorely disturbed by these investigators, the latter few of whom marked the beginning of a genuine intellectual anarchy of thought with regard to æsthetics, —an anarchy which it is Dr. Cohn's intention to remove.

The author refers to the dictum of R. Haym, made some forty-five years ago, that it was the goal of the philosophy of that time to recast *dogmatic* metaphysics into *transcendental*,—a phraseology which will be immediately intelligible to Kant-

ians. This task Dr. Cohn now feels himself called upon to perform, for æsthetics at least. It is, in his view, the purpose of æsthetics to investigate the peculiar species of *Werthe*, "values," criteria, or ratings, which hold sway in the realm of the beautiful and the artistic. The German word *Werth*, or value, is an ugly one to render into English, and its combinations, such as *Werthsysteme*, *Werthwissenschaft*, etc., are still more ugly and more meaningless in their literal English renderings. But the word is now the vogue in German professorial philosophies, and we shall doubtless continue to be tortured with it in their American imitations. In English we are content with "criteria," "norms," and "normative sciences," but the later Germans will have "values." Dr. Cohn prefers "value-sciences" to "normative sciences," and if he insists upon it we might compromise with the phrase "valential sciences," the word *valential* (from valence), although awaiting acceptance, having more euphony than the barbaric compounds with *value*. Be that as it may, Dr. Cohn's method of procedure, while inductive in character, strongly and rightly insists upon genuinely philosophical and metaphysical normative considerations, and is not disposed to allot to psychology or sociology, and much less to anthropology, the dominant influence in systematic æsthetical inquiry. *μ.*

SOURCE BOOK OF THE HISTORY OF EDUCATION FOR THE GREEK AND ROMAN PERIOD. By *Paul Monroe, Ph. D.*, Adjunct Professor of the History of Education, Teachers College, Columbia University. New York: The Macmillan Co. 1901. Pages, xiii, 515. Price, $2.25.

Dr. Monroe has rendered a distinct service to educational science in the present book of selections from the literary sources of the history of education, where he has brought together from the literature of antiquity the most important descriptions of the educational systems that obtained among the Greeks and Romans. The work is divided into two parts: The first consists of seven chapters dealing with old Greek education, the education of women in Greece, the new Greek education, the Greek educational theorists, philosophical, historical, and scientific, and the later cosmopolitan Greek education. In these chapters we have, on the educational ideals and institutions of the Greeks, selections from Plutarch, Thucydides, Xenophon, Aristophanes, Isocrates, and Plato; and on the educational theories of the Greeks, liberal selections from Plato, Aristotle, and Plutarch. The seven chapters of Part II. deal with the corresponding phases of Roman education. In this part the selections are made from Cicero, Suetonius, Plautus, Tacitus, Nepos, Marcus Aurelius, Horace, Martial, Seneca, Pliny, Juvenal, and Quintilian.

The translations which Dr. Monroe offers have been taken from the standard versions of such authors as Professors Jowett and Goodwin, and from the editions of the Bohn Library. The several periods, according to which the sources have been classified, Dr. Monroe has supplied a brief introductory sketch "indicating the general setting of the period to which it belongs, and the main principles of in-

terpretation to be followed." These introductory sketches are designed to furnish little more than a synopsis for study, the interpretation being purposely left in large degree to the students. In other words, the volume is designed as a text mainly, and we agree with Dr. Monroe in the belief that by the direct study which it thus involves "there will result, not only a more correct idea of the education of the classical period, but also a better apprehension of the meaning of education in its historical and contemporary aspects."

ACTES DU PREMIER CONGRÈS INTERNATIONAL D'HISTOIRE DES RELIGIONS, PARIS, 1900. Première partie séances générales. Paris: Ernest Leroux. 1901. Pages, xxi, 246.

After devoting some thirty pages to a description of the purposes and functions of the Congress, its rules, its ceremonial, social, and business meetings, its list of members, etc., the present first installment of the *Proceedings of the International Congress of the History of Religions*, held in Paris in 1900, is taken up with the discourses which were delivered on the general features of historical religious research, and its connexion with religious progress generally. The text of the proceedings opens with a characteristic letter from the late Prof. Max Müller; then follow two excellent discourses of welcome by Prof. Albert Réville and Monsieur G. Bonet-Maury. A. de Gubernatis speaks of the future of the history of religions; E. Senart discourses on Buddhism and the Yoga; Monsieur A. Sabàtier speaks of Biblical criticism and the history of religions; I. Goldziher contributes a paper on Islamism and Parseeism; Goblet d'Alviella discusses the historical relations between religion and ethics; Jean Réville gives an address on the present condition of instruction in the history of religions; L. Marillier, whose recent tragic death has been much lamented, furnishes a discourse on folklore and the science of religions; E. Fournier de Flaix offers some extensive and interesting data, in a paper on the statistics of religions at the end of the nineteenth century; and finally, the Hon. Charles Carroll Bonney, president of the World's Fair Auxiliary Congresses of 1893, contributes an historical sketch of the Congress of Religion held in Chicago in that year. The proceedings will have value in various ways for students of religion.

ETHIK. Von *Max Wentscher*. .I. Theil. Leipzig: Johann Ambrosius Barth. 1902. Pages, xii, 368. Price, 8.50 Marks.

Herr Wentscher's ethical programme is nothing short of militant, and bears a defiance on its face that bodes much ill for his opponents. It is outspokenly opposed to the spirit of our age, and to the spirit in which most ethical works are now written. The signature of our times is scientific, empirical, realistic, mechanical, practical. The key-notes of all expositions in the moral sciences are derived from the doctrines of evolution and its sociological and psychological analogues, and from the great overtowering generalisations of mechanical physics. Not so, how-

ever, the ethics of Herr Wentscher. It expressly disavows its modernity in this respect. It stands aloof from the tendencies of the epoch, and deals with them only to disapprove of them. It rejects the consequences for the control of practical life which have been deduced from the scientific theories now dominant; it is opposed to the transference of all such ideals into domains where, according to the author's opinion, they have not a shadow of validity. The modern tendency is avowedly deterministic and realistic; Herr Wentscher's ethics is avowedly undeterministic and idealistic. His ethics is, in fine, an individual, not a social, ethics.

In justification of his anti-modern position, Herr Wentscher remarks that possibly the spirit of the times is after all far broader and deeper than it would appear from the prevailing tendencies. He believes that there is hidden in the background of all the materialistic endeavors which seem to exercise so powerful a fascination on the life of the present day, a half recondite, dull, yet struggling impulse in humanity for absolutely liberating itself from the shackles of tradition, convention, and the blind worship of things as they are, of the historical *status quo*, and of the necessity of the present course of evolution. Everything seems to point, in his judgment, to a far more powerful longing and striving for clearness and light, and for a consequent untrammeled theory of purely individual and self-determined conduct. Herr Wentscher, now, would give scientific expression to this deep, obscure, and ominous undercurrent of the life of our century, and it is in this sense only that his ethics lays claim to modernity. It is to be a mirror of the spirit of the times, not as it appears at the surface, and in the loud brawlings of the day, but as it exists in its profound inward longings to bring humanity and life nearer to the goal which an ancient faith forefeelingly described in the words: "God made man after his own image." It is thus, to our author's mind, the business of ethics to point out the way of fulfilment for this longing after a mode of life in which we may bring to its fullest expression our likeness unto God, viz., our absolute freedom and our absolute perfection. Ethics must choose its criteria and ideals in accordance with this ambition, and not make them conform to the tendencies which the changing intellectual fashions of the day assume. It is to be the guide, and not the football, of the *Zeitgeist*. *μ.*

NOTES ON CHILD STUDY. By *Edward Lee Thorndike, Ph. D.*, Adjunct Professor of Psychology, Teachers College, Columbia University. Columbia University Contributions to Philosophy, Psychology, and Education. Vol. 8, Nos. 3–4. New York: The Macmillan Company. 1901. Pages, 157. Price, $1.00.

The present brochure consists of printed notes intended primarily for the use of classes at Teachers College, Columbia University. Since the author proposes to issue a new edition yearly, and confesses that they are incomplete and ill-proportioned, they will hardly be judged suitable for the general public, or for that matter for teachers generally of the subject, who have at their command the litera-

ture in a much more complete form. Of course, for instructors who have not the capacity or the incentive to seek the sources that are now easily accessible, they may be of value. It is, however, impossible for one not thoroughly conversant with the mechanism of the educational world to say that the sphere of their usefulness is limited; and it is quite likely that with the assistance which the author proffers to all who may use the book, and in view of the fact that busy teachers may thus be enabled to carry on experimental investigations with much economy of method and effort, they may be made to fulfil a distinct function and be productive of beneficial results. The subjects considered are: The Physical Growth of Children; General Physical Conditions and Particular Physical Defects; Unlearned Reactions; Learned Reactions; Sense Perception; Apperception; Attention; Imagery; Memory; Association; Reasoning; The Emotional Life of Children; Moral Education and Discipline; Adolescence; Directions for Practical Work; etc., etc.

The price of the volume, considering the fact that it contains but 157 pages and is unbound, is rather high, as are all our periodical university publications. *μ.*

THE WORSHIP OF AUGUSTUS CÆSAR. Derived from a Study of Coins, Monuments, Calendars, Æras and Astronomical and Astrological Cycles, the Whole Establishing a New Chronology and Survey of History and Religion. By *Alexander Del Mar*. New York: The Cambridge Encyclopedia Co. 1900. Pages, xxiv, 346.

This voluminous book is the product of the lucubrations of a man who takes a great interest in ancient chronology and the fixation of dates; but the ulterior purport of the book is religious. Alexander Del Mar, known chiefly for his various books on money, monetary systems, and the history of money in various countries, states the purpose of this present and latest book from his pen in the following words: "The abyss of misery and depravity from which Christianity redeemed the Roman Empire can never be fully understood without a knowledge of the impious worship of emperors to which Europe once bowed its credulous and terrified head. When this omitted chapter is restored to the history of Rome, Christianity will spring into a new and more vigorous life; for then only will it be perceived how deep and ineradicably its roots are planted, how lofty are its branches and how deathless are its aims." The book contains many interesting remarks, but the author decidedly lacks critique. He accepts unreliable statements which ought to be rejected. One instance will suffice to characterise his statements: On page 123 he fixes the era of the nativity of Buddha as 721 B. C. Among many correct statements, he says (following Lillie): "Buddha was born on the eighth day of the second month, viz., December 25th . . ." He further states that the "Messianic star stood over the place of his birth;" that "he was born among shepherds; that he was recognised by the seers or magi; his favorite disciple, of whom there were twelve, was Arjon; the duration of his long fast was forty days; his doctrines are

contained in the Baghant Geeta (*sic!*); he was condemned to death and he partook of a Last Supper with his disciples (Bishop Bigandet, II., 36); Buddha was cruelly murdered on the vernal equinox; he descended to hell to judge the dead, remained there three days and nights, rose again and ascended bodily to heaven. His principal sacrament was baptism; his flower the lotus; his epigraphic symbols the Latin and the Greek cross († +) and the mystic fan; his zodion was the Lamb; the sign of his future coming is the White Horse." P. C.

ALLGEMEINE PHYSIOLOGIE. Ein Grundriss der Lehre vom Leben. Von *Max Verworn*, Dr. Med. et Phil., Professor der Physiologie und Direktor des Physiologischen Instituts an der Universität Göttingen. Mit 295 Abbildungen. Dritte, neu bearbeitete Auflage. Jena: Verlag von Gustav Fischer. 1901. Pages, xii, 631. Price, bound, 17 Marks.

DAS NEURON IN ANATOMIE UND PHYSIOLOGIE. Vortrag gehalten in der gemeinschaftlichen Sitzung der medizinischen Hauptgruppe der 72. Versammlung deutscher Naturforscher und Aerzte zu Aachen am 19. September, 1900. In erweiterter Form herausgegeben. Von *Max Verworn*. Mit 22 Abbildungen im Text. Jena: Verlag von Gustav Fischer. 1900. Pages, 54.

We are glad to call attention to the appearance of a third edition of Dr. Max Verworn's well-known text-book of general physiology, which originally appeared in 1894, and of which the first chapter, treating of the objects and methods of physiological research, appeared in *The Monist* at about that time. The present edition has been increased by about 32 pages, and by some 10 new cuts. An English, French, Russian, and Italian translation of the work have now appeared, and the book in general has proved itself to be a useful manual. The point of view from which Dr. Verworn has approached his subject is that of *comparative physiology*, and in performing his task he has endeavored so far as possible to revert to the principles which guided the research of the great master of this science, Johannes Müller.

The same author has also given us in a printed lecture originally delivered in September, 1900, before the Congress of German Naturalists and Physicians, a concise synopsis of the researches which have been conducted in connexion with the doctrine of neurons. The idea lying at the foundation of the doctrine of neurons is that the ganglionary cells and the nervous fibres proceeding from them constitute a single unit. The axal cylinder of the nervous fibres, with its collateral and terminal ramifications, is, like the numerous dendrites, a continuation only of the ganglionary cell. This doctrine, which furnished the first monistic principle for the treatment of the nervous system, has been so fruitful in its influence in all practical and theoretical directions, that it may safely be said that the unusual activity and interest shown during the last ten years in neurological research has been nearly altogether due to the stimulus imparted to it by the doctrine of neurons. The doctrine has been the object of considerable adverse criticism, and has

been subjected to assaults on all sides. It is the opinion of Prof. Verworn, however, that its truth has not in the least been shaken and that it will continue to exercise a salutary influence in the future. There are 22 cuts in the brochure, and numerous bibliographical references of value.

NOTE.

Mrs. Mary Everest Boole, the writer of the article, "Suggestions for Increasing Ethical Stability," in the present *Monist*, is the widow of the famous mathematician and logician, George Boole, the author of the well-known treatise on *The Laws of Thought*, which has been characterised as marking "the greatest advance in logic since Aristotle." Mrs. Boole's uncle was the surveyor-general of India, after whom Mt. Everest was named. She became Professor Boole's assistant and afterwards his wife, working together with him on his logical and mathematical investigations until his death in 1864, and afterwards continuing on the psychological and educational side the labors which he had left unfulfilled. She says: "At his death numerous mathematicians wrote offering to help me. But I felt that accepting their co-operation would involve me in some connexion with what was then known as 'Boole's Method.' The mathematical world at that time were jealous and distrustful of any allusion to the psychological aspect of mathematics. I preferred to take a humble post in a college and study the application of Boole's method to psychology, *clinically* (so to speak), by trying its effect on solving the moral problems of school-girls. My book, *Symbolical Methods of Study*, grew out of Sunday evening talks with the college boarders. After a few years I met James Hinton, author of *Life in Nature*, etc., and, by his advice, gave up most of my college work and became his secretary. I taught him enough algebra to enable him to join me in an investigation of the connexion between the mathematical and the physiological aspects of psychology.

"About 1884 I gave a lecture to the Education Society about some forms of mental and moral aberration far more common in girl's schools then than they now are. I wrote on this and kindred topics in the Jewish press and then devoted some time to the psychological analysis of the mental conditions which go to make the majority of the human race interested in the questions of incarnation and miracle. Continuing my studies in psychology as seen from the medical aspect, under the direction of Henry Maudsley, M. D., the well-known brain-specialist, and of Helen Webb, M. B., of the Parent's Educational Union, lecturer on 'Neurotic Children' and on 'The Formation of Habit,' I wrote at Dr. Maudsley's request a text-book of *Mathematical Psychology* for the use of medical students."

The present article on "Ethical Stability" is the outcome of Mrs. Boole's practical studies on the lines last mentioned. It has been characterised by Professor James who heard the paper read, as "full of most suggestive matter, and as moving among the concrete facts of human nature in what to my mind is a refreshing way."

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THE MONIST

THE FIRST PHILOSOPHER.

DURING a recent sojourn among the treasures of the British Museum, it was the writer's good fortune to subject to close scrutiny an ancient stone,[1] the importance of which had hitherto been entirely unsuspected. It contains the oldest known philosophical explanation of the world, written a thousand years before the first Greek philosopher was born. It therefore, for the first time from any foreign, pre-Socratic source, furnishes tangible support to the Greek tradition of the origin of their philosophy in the East. A hasty glance at the monument, first in its general and then its more particular aspects, will doubtless serve to set it into its proper perspective before the eye of the modern reader.

"The History of the Human Mind," or something similar, will be the title of perhaps the most important book of the future. Modern experimental psychology, anthropology, physical and otherwise, archæology, study of modern and ancient literature, history, comparative religion,—in short, anthropological study in the widest conceivable sense, with its myriads of delvers, burrowing into a thousand far corners, is rapidly furnishing the material and the data for this coming book. Although a vast amount of work remains to be done upon all classes of materials, yet enough has been accomplished already to determine the main lines of a gradual evolution of the powers of the human mind through ages, as clear as the evolution of physical forms. It is the failure to rec-

[1] No. 135.

ognise this fact which leads some good but misguided people, like many theosophists, to imagine that their idealised and purely subjective notion of early religions and ethical teaching is an actual, modern revival of lofty truths and precepts once held and practised in remote centuries before our era, for example in Egypt. A knowledge of even the simplest facts of the evolution of the human mind, a knowledge such as Browning shows in Caliban, would instantly reveal to such people the impossibility, not to say absurdity, of their assumption. Shall we, living as we do in these days of highly developed ethical consciousness and ripe religious culture, turn back the evolutionary process and revert to the embryonic ethics of a remote past? Such action would be as reasonable as the procedure of the man who, seeking cooling shade and refreshing fruit on a hot day, should go and sit under an acorn and eat watermelon seeds.

I fear that to the orthodox classical scholar these earlier stages of the human mind have little interest; for to him its history begins with the Greeks. But some of the important steps in this evolution, like the rise of the ethical consciousness, lie not merely back of the Greeks, but back of the age of writing, and must be studied in material remains, or in modern survivals of primitive culture. Only its subsequent developments can be studied in the literary age. But there is one fundamental step, which was taken far within the literary age, for which exclusive credit has hitherto been given to the Greeks. I refer to the development of the ability to contemplate the world philosophically. There is of course no question but that the effect of this momentous step upon the later world is due to the Greeks, whose genius was able to follow it up and develop an elaborate system of philosophy, which they bequeathed to modern Europe. But the Greeks themselves affirm that their philosophy was received from the East, especially Egypt. Modern criticism has for the most part rejected this tradition of the Greeks, nor has any document ever found in Egypt heretofore offered confirmation of this Greek tradition. It has therefore remained as the accepted fact that the human mind, after its ages of slow progress, first showed itself capable of a philosophical expla-

nation of the world in the seventh century B. C., and that this all-embracing conquest was the work of the Greeks.

The difficulty in investigating the Greek tradition of the Eastern origin of their philosophy has heretofore been insuperable. There was almost no material. Thought is an elusive thing, even when in writing, but when the said writing must survive through thousands of years, the chance of preservation is reduced to the vanishing-point. Out of the wreckage of millenia, it was recently the writer's good fortune to find in the British Museum a single chip, but bearing its message of thought from those centuries in Egypt, from which the Greeks themselves aver that they drew the beginnings of their philosophy. The monument was published two generations ago, in the days when little was known of hieroglyphic, and accurate study of epigraphy was unknown. The publication read and numbered the lines of the inscription backward, contained a multitude of errors, and failed to see so many of the fading glyphs faintly glimmering on the stone, that the few who have since then noticed the document as published, not perceiving the proper order of the lines, have naturally been unable to apprehend its remarkable content. The present writer, being at the time engaged in studying the Egyptian inscriptions of the British Museum for the Imperial Dictionary at Berlin, was fortunate enough to subject the stone itself to a searching examination of some ten days, during which he made first a rough copy, and then a careful scale copy.[1] Every tiniest fading scratch upon the stone was minutely examined over and over again, throwing the light upon it at varying angles from a mirror, and the copies were thus repeatedly checked and collated with the original. This work soon made clear the proper order of the lines and brought out many words and even whole sentences before unnoticed in the badly preserved places. The remarkable content of the document was then evident.

The monument is a rectangular slab of black granite, three

[1] This copy has appeared on a large scale, with critical exposition, in the *Zeitschrift für ägyptische Sprache*, and will be published on a slightly smaller scale in a forthcoming number of *The Open Court*.

feet high by four and a half feet in length, as it stands upon the long edge. Set up in the temple of Ptah at Memphis, by King Shabaka, in the latter half of the eighth century B. C., it later suffered defacement by both political and religious fanaticism, and was finally removed by some vandal, who, cutting a large hole in the middle and rough channels radiating from the hole, employed it as a nether millstone. The middle portion of the inscription was thus totally obliterated, and the modern student finds about a fourth of it, in good preservation at each end, merging gradually into illegibility and then into bare emptiness, without the trace of a sign, as the eye moves from the end to the centre. In this uncertain border-land between the ends and the centre there is plenty of room for industry; days of painful scrutiny as the eye fastened on one spot vainly strives to wrest its secret from some passage of tantalising suggestiveness, till at last the missing signs are caught glimmering dimly from among the scratches left by that odious upper millstone. The inscription is in sixty-one vertical lines, surmounted by a superscription in two horizontal lines, the first of which contains the full name and titulary of Shabaka,[1] an Ethiopian king of Egypt in the second half of the eighth century B. C. The second line states that "his majesty wrote this document anew in the house of his father Ptah,[2] his majesty having discovered it, a work of the ancestors, eaten of worms; it was not legible from beginning to end. Then [he] wrote [this document] anew, more beautifully than the one that was before, in order that his name might abide, and his monument endure in the house of his father, Ptah, for all eternity." This superscription dates the monument with certainty, and avers that its inscription is only a renewal of an older document. This statement is confirmed both by the language, orthography and content of the inscription; indeed all the internal evidence would point to a date at least as old as the early eighteenth dynasty, the sixteenth century before Christ, and there are indications of even greater antiquity. As to its authorship,

[1] Usually identified, though with some uncertainty, with So, the ally of Hoshea of Israel (2 Kings xvii. 4).

[2] The god of Memphis.

there is no indication in the document. It is of course the product of the Memphite priesthood, for the temple of Ptah was located at Memphis, and the composition is doubtless the result of slow growth, rather than the work of one man.

In general the document is a disquisition on the god Ptah, toward the close of which is found the following hymn[1]:

"Ptah, the great, is the heart and tongue of the gods . . . .
Ptah, from whom proceeded the power
Of the heart,
And of the tongue . . . .
That which comes forth from everybody (thought)
And from every mouth (speech)
Of all gods, of all people, of all cattle, of all reptiles,
That live, thinking and commanding
Everything that he (Ptah) wills . . . .
The gods fashioned the sight of the eyes,
The hearing of the ears,
The smelling of the nose,
That these might furnish the desire of the heart.
It (the heart) is the one that bringeth forth every successful issue.
It is the tongue which repeats the thought of the heart;
It (the heart) was the fashioner of all gods . . . .
At a time when every divine word
Came into existence by the thought of the heart,
And the command of the tongue . . . .
It (the heart) is the maker
Of that which is loved,
And that which is hated;
It is the giver of life to the innocent,
The giver of death to the guilty.
It is the maker of all handiwork,
And of every handicraft.
The doing of the hands,
The going of the feet,
The movement of every member
Is according to its (the heart's) command,
The expression of the heart's thought,
That cometh forth from the tongue,

[1] A number of theological references have been omitted in the following translation. A full translation of the document will be found at the end (pp. 333–336).

And doeth the totality of everything . . . .
Everything has come forth from him (Ptah),
Whether offering, or food, or divine oblation,
Or any good thing . . . .
He formed the gods,
He made the cities,
He equipped the nomes,
He set the gods in their adyta (holy places),
He made their offerings flourish,
He equipped their adyta,
He made likenesses of their bodies,
To the satisfaction of their hearts,
So that the gods might enter into their bodies.
Of every wood,
Of every costly stone,
Of every metal,
Of every substance."

It will be evident to the reader that the word "heart" in the above extract is used for "mind," while "tongue" designates the expression of the mind's content in language. That two such concrete terms should be used to indicate abstract conceptions is entirely Egyptian and common enough almost anywhere. Understanding these two terms, we see that the above composition is a hymn in praise of mind, with occasional reference to Ptah, with whom mind is identified,—a hymn which reminds us of the lofty didactic poems, in which some of the pre-Socratic philosophers, like Empedocles, were wont to set forth their systems. The system which our hymn proclaims is, for an age so remote, marvellously rational. The source of all things is mind, wherein all things originate as thought, and the efficient force by which these thoughts become objective realities, is speech. This notion of the efficacy of the spoken thought is one suggested to our Memphite philosophers by the use of the spoken word, always so efficacious in Egyptian magic. The use of the efficacious word in creation has long been known, as found in Egyptian theology. It has been especially treated by Maspero (*Bib. égyptologique*, II., pp. 373–380), who thinks the use of an unintelligible vocable by the god (as in a late Greek papyrus) is a *higher* form of creation. This is clearly

disproved by our text which makes the tongue the agent for the expression of *thought* in each case of creation. Such use of the tongue is unquestionably higher than the utterance of unintelligible, magical hodge-podge. Maspero says: "Au début, le créateur avait parlé le monde, plus tard il le sonna: il lui restait encore à le penser, mais c'est là une conception à laquelle les théologiens de l'Egypte ne paraissent pas avoir songé." It is just the prominence throughout our Memphite philosopher's system of the god's initial *thought*, which makes it new and gives his uttered fiat the dignity and loftiness of the biblical cosmogony, with its simple means: "And God said."

These two things: mind and its efficient force, speech, are identical with the god Ptah. The world then—I would not venture to say universe—is the product of the god's thought and speech. All the sentient beings in that world, viz., gods, men, and beasts,[1] (*sic!*) owe mind and speech at creation, as well as all the daily ideas which they act upon and carry out, to the god. They think and carry out that which Ptah wills. The gods are recognised as a kind of beings superior to men, and as Ptah is both their mind and their efficient force, they are, as it were, merely vehicles of Ptah, forms of him, or a kind of composite personality which is Ptah. Their only productive act in creation was that of furnishing to mind its means of receiving impressions from the objective world, viz., the senses, which "gratify the desires of the heart." There is no clear consciousness of the metaphysical problem,—no attempt to define mind or to distinguish it from matter. For matter itself, indeed, is unconsciously assumed, or if thought of at all, is conceived only in the finished forms, which are the realisation of the god's ideas.

The most remarkable feature of all this is the characterisation of the god as the mind in everything, whether gods, men, or beasts, and reminds one of Thales's statement, that "all is full of gods." This was an idea, as far as man is concerned, of which there is evidence in Egypt, outside of our document. Under King Thoth-

[1] Democritus ascribed reason and soul to all, even inanimate things.

mes III., the greatest of the Egyptian conquerors (sixteenth century B. C.), the court herald Intef says on his tombstone in the Louvre: "It was my heart which caused that I should do them (his services to the king), by its guidance of my affairs. . . . I did not transgress its speech, I feared to overstep its guidance; I prospered on this account exceedingly. I was distinguished by reason of that which it caused that I should do; I was successful through its guidance. 'Lo,' said the people, 'it is an oracle of the god which is in every body; prosperous is he whom it hath guided to the propitious way of achievement.' Behold, thus I was."

It is this teaching which justifies the statement that "everything (not excepting the works of his creatures) came forth from him," for every creature is but a manifestation and vehicle of the all-pervasive divine mind. Finally it is to be noted that this sway of Ptah is strongly ethical, rewarding virtue and punishing vice.

In estimating this Memphite system it must be clearly understood that our philosopher has tried to interweave his philosophical conceptions with the existent Egyptian mythology and pantheon. Of course, the original Ptah had in the minds of his priests no more connection with such philosophical notions, than had the early Greek gods with the later philosophical interpretation of their functions and relations, already beginning as early as the pre-Socratic thinkers, whose manner of thinking forms a parallel to the interpretation of Ptah in our inscription; a parallel which becomes much closer in post-Christian times. And just as, to the Greek mind, the philosophical interpretation of a god was often suggested by his place or function in mythic story, so in our Memphite system. Ptah had been from the remotest ages the god of the architect and craftsman, to whom he furnished plans and designs. Contemplating this god, the Memphite priest, little used as his mind was to abstractions, found a tangible line, moving along which he gradually gained his philosophical conception of the world. The workshop of the Memphite temple, where under Ptah's guidance were wrought the splendid statues, utensils, and offerings for the temple service, expands into a world, and Ptah, its lord, grows into the master-workman of the universal workshop.

This is clear from the fact that our inscription actually regards the world more as a vast temple workshop and domain, producing offerings and utensils for the gods under the guidance of Ptah. Like some thinkers of the present day, our Memphite priest cannot get away from his ecclesiastical point of view. But this *origin* of the Memphite system in the mythic god and the admixture of other mythic divinities does not deprive the *finished system* of its character as a philosophy, adequately explaining the world as our priest saw it. His doctrine of the ideal world stands of itself, and is stated more than once in entire independence of the mythic divinities and elements, which he also employs. It must furthermore not be forgotten that the earliest of the Greek thinkers were forced to similar recourse to mythic elements. Thus the first Greek philosopher, Thales, assuming water as his primal element, is unable to explain the cause of the rise of things from water. "He probably thought that the efficient force was directly combined with matter, and conceived this force in the spirit of the old nature-religion as analogous to living forces, as is seen in the assertion that "all is full of gods." Even the later pre-Socratic philosophers, like Empedocles, were likewise compelled to "annex moving forces to the elements *in a mythical form.*" The only superiority of such philosophers over our Egyptian lay in the fact that their systems did not *originate* in the myth, but merely had recourse to it in the last steps. They began with matter and failed to arrive at one controlling mind; our Egyptian began with such a mind and never arrived at matter, in the Greek sense. But his conception of the function of mind and idea in a philosophical system is so clear and so high that it is *even modern* in its superiority over those strange objective "ideas" of Plato.

This is not the place to examine the genuineness nor the sources of the Greek tradition of the Eastern origin of their philosophy. Suffice it to say that it exists, and is defended as true by able and reputable modern students of the history of philosophy, like Röth and Gladisch.

I should be the last to imagine that any of the great systems of philosophy among the Greeks was as a whole transmitted thither

from Egypt. But it is now clear that valuable philosophical beginnings, denied and heretofore justly denied to Egypt by most historians of philosophy, existed in Egypt a thousand years before the first Greek philosopher was born. The objection to the origin of Greek philosophy in Egypt on the ground that no such material is to be found there, now falls away. The former opinion of archæologists regarding the sources of Greek art, is strikingly analogous to the present prevailing opinion of philosophers concerning the origins of Greek thought.

Winckelmann and all the early archæologists until two generations ago[1] maintained that the *art* of Greece was, both in its *origin* and in its development, solely the product of Greek genius. But the spade of the excavator and the studies of the archæologist during the last seventy-five years, have clearly demonstrated that while the *development* of Greek art and the exalted *ideas* of which it became the superb vehicle, are indeed solely the product of Greek hearts and hands; nevertheless the *origin* of many of the fundamental elements, so nobly employed by the Greeks, is far earlier in date and belongs to the civilisation of the East, especially Egypt. It remained for Greece, having received a great artistic inheritance from the East,[2] to assimilate its elements, to combine, to diversify, to enrich, to develop, and at last to employ them in the expression of ideals of beauty, which had never dawned upon the vision of the East. Thus it has become clear, that in art at least, Greece can no longer be cut off and isolated from the earlier past of the race. Again, the archæologists from the first perceived that the art of Rome was an inheritance from Greece, yet they did not draw a now obvious analogy, and conclude that likewise the art of Greece, in its turn, owed much to earlier civilisation. Roman philosophy was

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[1] Down to Otfried Müller, who published his *Handbuch der Archäologie der Kunst* in 1835.

[2] I am aware that of late the classical archæologists are explaining the remarkable rapid development of Greek art in the sixth and fifth centuries by the influences surviving from Mycenæan civilisation. This however does not affect the established fact of the strong influence of Egypt noticeable in the earliest historic art of Greece, at a time, be it noted, when her intercourse with Egypt first became close and intimate.

likewise an adoption of Greek systems. Shall we like our fathers fail to draw the obvious analogy? Was art so isolated a fruit of Greek life, that, while admitting that it strikes its roots deep into the civilisation of the East, the other branches of the splendid tree must be excepted? There is not space here to note the elements in the Memphite philosopher's system, which, assimilated by the ready mind of the Greek, might have become pregnant seeds, ready to germinate and in that incomparable soil, to burst into the richest fruitage. Such potential germs, as our Memphite's "divine word," might easily have been of powerful suggestiveness for the later Greek notion of *nous* and *logos*. Again our philosopher's single, all pervasive mind, governing by thought, might easily have been the hint to Xenophanes in affirming the existence of but one god, " 'neither comparable to mortals in shape, nor in thoughts,' 'all eye, all ear, all thought,' 'who without trouble, by his thought, governs all things.' " Similar comparisons will suggest themselves even to the casual reader of Greek philosophy. But probably enough has been said to show what it has been the writer's purpose to emphasise throughout, viz., that the rise of European civilisation is by no means as abrupt as it has seemed, and that the transition from the civilisation of the East to that of the Greek archipelago and peninsula was a very gradual one, a long period, which was neither the end of one nor the beginning of the other. During this long transition period, the Greeks assimilated not merely material forms in art, mechanical processes, customs, an alphabet, etc., from the East, but also some of its thought. That that thought was of a character to furnish a basis for the earlier philosophy of the Greeks, our document plainly shows. Moreover we must not forget, that while a part only of one such monument has survived, there must have been many on more perishable material which have passed away. Such thinking as our document exhibits was not confined to one stone slab; but elaborated and committed to papyrus must have been a common possession of the priesthoods of Memphis, Heliopolis, and the other great religious centres of Egypt, particularly those in the neighboring Delta, the region where Greeks were numerous residents from the seventh century

B. C. Under these circumstances, it would be almost a matter of course that the fundamental ideas of priestly thinking should reach Greece. Thus the Greeks, however great their genius, like every other people, are not to be cut off from their predecessors. In all the elements of life, they must have received their inheritance as all other peoples have done; and they bequeathed it to the later world, enriched as no legacy has ever been enriched by any other people.[1]

TRANSLATION OF THE TEXT.

[*The following translation contains all that is to be made out with certainty. A few obscure phrases are omitted, as well as the fragments around the left edge of the worn circle, which are too disconnected for rendering. The first two lines contain the superscription as given above (p. 324), and the text itself begins with line 3.*]

(3) This Ptah is he, who is proclaimed under this great name. (4) The Southland and the Northland are this Uniter, who appears as King of Lower Egypt. [(5) left blank]. (6) He that begat him is Atum, who formed the Nine Gods, (7) to whom the gods offered when he had judged Horus and Set. (8) He defended their litigation, in that he set up Set as King of Upper Egypt in the Southland, from the place where he was born, Sesu (?); whereas Keb, he set Horus as King of Lower Egypt in the Northland, from the place where his father was drowned; (9) at the division of the Two Lands. It is Horus and Set who stood on the ground (?); they joined the Two Lands at Enu (?); it is the boundary of the Two Lands.

(10a) Keb (to) Set, speech; "Hasten from the place, wherein thou wast born."

(11a) Keb (to) Horus, speech: "Hasten from the place wherein thy father was drowned."

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[1] I need hardly add that the above essay intentionally ignores the really philosophical systems found in Indian and Chinese theologies, etc. This has been done, because such systems have remained totally isolated and without connection with Greek or modern civilisation. Moreover they are vastly later than the Egyptian system presented above.

(12a) Keb (to) Horus and Set, speech: "I will judge you."

(13a–17a) Keb (to) the gods: "I have assigned the inheritance to that heir, to the son of the first-born son."

(10b) (To) Set the Southland! It is evil to the heart of Keb, that the portion of Horus should be (only) equal to the portion of Set.

(11b) (to) Horus the Northland! It is Keb, who gives his inheritance to Horus, he being the son (12b) of his first-born son.

(13c) Horus stands on the earth, he is the uniter of this land, proclaimed under the great name, "Totenen south of his wall," lord of eternity. (14c) The double crown flourishes on his head; he is Horus, appearing as King of Upper and Lower Egypt, Uniter of the Two Lands at the stronghold, at the place where the Two Lands are united. (15c) Now when the — (?) and the column were at the front of the house of Ptah, Horus and Set were united, joined, they became brothers, they no longer strove together. (16c) . . . . united in the House of Ptah, in the place . . . . wherein the Southland and the Northland join (?); it is this land. (Broken references to the Osiris-myth follow, and then comes the great central lacuna.)

. . . . . .

. . . . . .

(48) Ptah is the Being of the gods (??)

(49a) Ptah upon the Great Throne is. . . . . .

(49b) . . . . . fashioner of the gods.

(50a) Ptah-Nun is the father of Atum.

(50b) . . . . . fashioner of the gods.

(51a) Ptah-Nekhabet is the mother who bore Atum.

(51b) . . . . . .

(52a) Ptah the Great is the heart and the tongue of the gods.

(52b) . . . . . at the nose of Re every day.

(53) He that became heart, and he that became tongue are an emanation of Atum. . . . their Ka's being this heart and this tongue.

(54) Horus came into existence through him, Thoth came into existence through him, through Ptah, from whom proceeded the power of the heart and the tongue. . . . He is the one who makes to

[lost causative verb] that which comes forth from every body (thought), and from every mouth (speech), of all gods, of all people, of all cattle, of all reptiles, which live, thinking and commanding [lit., "commanding the word of everything....] everything that he wills.

(55) His Ennead is before him, being the teeth and the lips, the phallus and the hands of Atum.... (For) the Ennead of Atum came into existence from his phallus and his fingers; the Ennead indeed being the teeth and the lips in this mouth, which proclaims the name of everything; and from which Shu and Tefnut came forth.

(56) The gods fashioned the sight of the eyes, the hearing of the ears, and the smelling of the nose, that they might furnish the desire of the heart. It (the heart) is the one that bringeth forth every successful issue. It is the tongue which repeats the thought of the heart; it (the heart) is the fashioner of all gods, at the time when every divine word even, came into existence by the thought (57) of the heart, and command of the tongue. It (the heart) is the maker of Ka's....the maker of every food-offering and every oblation, by this word, the maker of that which is loved and that which is hated; it is the giver of life to him who bears peace (the innocent), the giver of death to him who bears guilt. It (the heart) is the maker of all handiwork, and of every handicraft, the doing of the hands, the going of the feet; the movement of every member is according to its command (viz.,) the expression (lit. "word") of the heart's thought, that cometh forth from the tongue and doeth the totality of everything..... Ptah-Totenen, he being the fashioner of the gods; everything has come forth from him, whether offering or food or (59) divine oblation, or any good thing.

He is Thoth, the Wise; greater is his strength than (that of the gods. He united with Ptah after he had made all things, every divine word; when he formed the gods, made the towns, equipped the nomes, placed the gods in their adyta, (60) made their offerings flourish, equipped their adyta, made likenesses of their bodies to the satisfaction of their hearts; then the gods entered into their bodies, of every wood, of every costly stone, of every metal (?),

and everything, that grows upon his....(?) (61) from which they come. It is he to whom all the gods sacrifice, their Ka's being united, associated with the Lord of the Two Lands. The divine storehouse of Totenen is the Great Seat attached to the heart of the gods who are in the house of Ptah, lord of life, lord....wherein the life of the Two Lands is made.

(62)[1] ....Osiris, he was drowned in his water; Isis and Nephthys saw; when they beheld him, they were of service to him. Horus gave command to Isis and Nephthys in Dedu, that they should save Osiris, and that they should prevent that he drown. (63) They went around....(?), they brought him to the land, he entered his secret structure in....of the lords of eternity, at the footsteps of him who rises in the horizon upon the highways of Re in the Great Seat. (64) He associates with the court, he becomes a brother to the gods.

Totenen-Ptah, lord of years, he hath become Osiris in the land, in....on the north side of this land. His son Horus comes to him, appearing as King of Upper Egypt, appearing as King of Lower Egypt, in the presence of his father, Osiris and the gods, his ancestors, who are behind him.

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[1] The *n* at the head of the line may be the negative as at the head of the duplicate line (19), so that we could render: "Osiris was *not* drowned in his water." The statements in ll. 8 and 11a, that he *was* drowned, would then probably indicate that he was merely nearly drowned.

EXPERIMENTAL INVESTIGATIONS IN TELEPATHIC HALLUCINATIONS.

VIII.

THE chief conclusions from the evidence presented in the last number of *The Monist*, stated as immediate inferences from the figures, are:

1. So-called telepathic hallucinations actually exist, and moreover they manifest themselves on a large scale, at any rate among our subjects, in ways contrary to the common belief in the matter.

2. They appeal in several sensorial forms: most numerously in the sense of sight, and next in that of hearing. Telepathic hallucinations are also found in the senses of touch and of smell, a fact which, so far as we know, has not been sufficiently emphasised before.

3. There is a striking inconsistency between the firm belief in the coincidence of telepathic hallucinations and the reality of the fact determined by the experimenter; thus, to cite but a single case, out of 1011 cases examined into, of which 981 were accompanied by a complete belief in the reality of the fact, we traced up 943 errors and found but 40 exact coincidences. The same relation is shown by our other figures.

4. The proportion of genuine cases per hundred is exceedingly small, and notably so if it is referred to the total number of cases examined; thus we have 5.47 per cent. if we take account only of those cases which showed some exact coincidence confirmed, and 2.61 per cent. in the contrary case, or further, only 2.25 per cent. the total number of cases, 1374.

5. Women as well as men experience these hallucinatory sen-

sations, although women are somewhat more subject to them than men, but the amount of education counts for a good deal in this matter. Higher education seems to free the mind from credulity, and renders it somewhat immune to telepathy. The existence of telepathic hallucinations is certainly proportioned to the sentimentality and the orthodoxy of the subject. A believer is more liable to such states of mind than a rationalist, a fantastic imagination than a logical mind. In order to better prove this statement we must emphasise the observations made upon the belief in telepathy in various circles. In France, as well as in Roumania, there is always, according to my observations at least, a close relation between training, environment, education and social or other beliefs. For instance, among peasants, religious as they are in almost all countries, belief in telepathy is a positive, indisputable fact; it is the same among priests, nuns and the more or less educated orthodox believers. This belief decreases considerably in artisan circles that possess some degree of information about social, intellectual and religious life. Among the learned classes faith becomes almost null and is replaced by a sort of rational skepticism or by a profuse argumentation, which in some cases leads to the conclusion that such facts are possible, and then a certain credence is given to sensorial hallucinations, and in other cases leads to more or less logical conclusions that would force the unknown and the problems of the unknowable, according to the manner in which their solution is regarded. The conclusions are mostly involved, being mixed up with occultism, spiritualism, and transcendental dogmatism besides. Here are some figures that finely illustrate our assertions:

	PERCENTAGE OF PROBABILITY CREDITED TO TELEPATHY.
Peasants lacking education entirely	90 per cent.
Priests having religious instruction	98 "
Priests having mediocre or higher education (20 subjects)	68 "
Artisans and employees of moderate education	25⅓ "
University men; publicists; writers	9.5 "

Each report is based upon the determinations made with 50 subjects, all in Roumania. The peasant is religious and credulous,

and telepathy according to his intellectual conceptions is perfectly logical; while the educated man, here as elsewhere, is rationally skeptical, which does him credit.

In France we have likewise made observations in various environments; our reports refer to 30 cases of each class, and we regret not to have been able to make observations in religious circles. Nevertheless, from certain conversations and observations that we have gathered the fact is brought out clearly, that the priest and the educated orthodox man believes in everything that pertains to the miraculous. I should even go so far as to say that a miracle does not appear phantasmagoric to them, as it does to us, and that according to their logic it is almost a biological fact, if not more. Among the peasants of the neighborhood of Paris and Royon the percentage of probability was 78 per cent.; it was 12 per cent. among the artisans, and strange to say, here the intellectual people, university men, publicists, writers, gave the hallucinations far more credence than elsewhere, and much more than did the artisans; the average probability indicated by this class is 36 per cent. Is this perhaps due to the occult, magic, mystical sciences of all sects that engross the finest intellects in Paris? I am really not able to decide. The fact seems to me certain, however, and the more so since the circles devoted to the more or less scientific cult of the marvellous are more numerous in Paris than elsewhere, and they receive more attention from the intellectual world here than in a quietistic country of the East.

It is also to be observed that the age of the subject counts for something in the credence given to telepathic hallucinations and to their existence. A young man rarely has such hallucinations, while a mother, a father, in other words an older person, is more likely to experience them and to believe in them. It seems to me an established fact; I have met it in all classes of society, and it would seem that to feel this kind of sensitiveness to telepathy, one must have had more knowledge of life, deeper, dearer, more enduring memories, sorrows and experiences, than fall to the lot of young people who are still charmed with dreams, with the ideal, and with life that has scarcely begun to tremble upon their lips. Life spreads

out into infinity before them, it is still the inspiring source of beauty, of desires; it still enfolds the mysterious future, and the real sorrows of life have not tortured their brains which are like flowery fields. For those that are older the mysterious makes a stronger impression upon their life; the future is less gloomy, and the eternal, "What do I know?" or "What am I?" becomes categoric. One can know, and the need is felt of gathering up as we go, the crumbs of our lost life, of our scattered ego. Attention is turned toward the sources of the affectionate emotions, and the mind more readily yields to the hallucinations of the senses, being the prey of pain, grief and unsatisfied hopes. This is the psychological explanation that we give for the influence of age and the belief of older persons in telepathic hallucinations.

IX.

Before concluding and before formulating our hypothesis upon the nature of telepathic sensorial hallucinations we ought to discuss and criticise the interesting observations of the English investigation of telepathy. We have already shown in the course of our exposition the dominating idea of our work, and a fuller collection of evidence would in our opinion be useless. The most important criticism that could be made, and that has already been made, of the English investigation is the implicit confidence given to unknown subjects, in spite of the apparent reserve repeatedly expressed by Messrs. Gurney, Myers and Padmore. We shall let these authors speak for themselves, quoting their own words, although it is true that they write in their introduction (p. 13). "In order that the facts which we have collected may be convincing, it is clear that they ought for the most part to be gathered by ourselves." And further on: "Even if there had existed sufficient well-established testimony to excuse us from collecting any more, it would still have been advisable for us to see the persons that were the subjects of these strange hallucinations, and to talk and correspond with them. That would be the only way to make sure of the good faith of the witnesses." This is the method that I myself have followed and I am sure that it will be regarded as the best

one; my English contemporaries concede this themselves. I am willing to compare my results with theirs, after having learned from their own admission how much confidence and how little analysis they bestowed upon their subjects.

At the bottom of the same page (13) we read: "Of course we are not safeguarded from involuntary errors of observation and of memory, but yet it should not be assumed that our correspondents in general have less precise and less accurate faculties than the average of men. Our exact and precise method has relieved us of all the sentimental and ill-balanced spirits that love the mysterious for its own sake. On the contrary, we have met with very frank responses from a large number of people who have felt with good reason that the obscurity with which these events are surrounded makes it still more necessary to report them with exactness and soberness. The simple and precise style of most of our correspondents, the honored names borne by some of them, may give the readers something of that confidence which our spirits have received from a closer contact with the facts."

Further on, p. 22, in the second chapter, the authors express themselves as follows: "It is the accumulation of experiences that should establish certitude. We do not base the proof of the exactitude of our experiences upon the honesty and the intelligence of each individual experimenter, but rather upon the fact that it is inconceivable that a large number of reputedly intelligent and honest persons should all permit themselves to be tempted into fraud, or should all have been deceived."

"We have a large number of testimonies first-hand," write the authors, p. 54, chapter IV, "coming from intelligent and educated people whose common sense has never been questioned. The majority were not disposed in advance to admit the reality of the phenomena. In many cases their accounts did not seem to them to contain anything of special interest. While unable to deny the facts of which they had been witnesses, some of them even professed an entire skepticism regarding this class of phenomena. The facts themselves do not involve any particular belief. There is in this a striking contrast between telepathy and the apparitions of

the dead. The belief in the survival of the dead beyond the grave is widespread among the people, and no less so that of their appearance to their relatives and friends. But the same cannot be said of apparitions at the moment of death. Without any doubt we find instances of this in works of history and tales of travel; but while these examples are numerous, they are isolated, and even those who speak of them mention them as rare marvels; they do not introduce them as evidence in support of some general belief. This notion is even so new that on most occasions apparitions of this sort have been regarded by those that saw them as being apparitions of those already dead."

All these considerations and others still more numerous lead the authors to believe "that they prove, supposing that we interpret them correctly, that a spirit can act upon another spirit or receive impressions from it by other means than those of the senses."[1] In such a conclusion as this ended the investigation of the London Society for Psychical Sciences, conducted since 1882 by Gurney and Myers. We remember that the English authors had invited the public to respond regarding such facts as they might know relative to the apparition of persons at the point of death or after death.[2]

One fact is certain in the investigations of Messrs. Gurney, Myers and Podmore, and this is, that they have too great confidence in their subjects, at least for the majority of anonymous correspondents, and accept as more or less disputable truths, but yet as truths, all the lucubrations of the numerous correspondents who reply to their inquiry. It could not have been otherwise, considering that these documents by this very title constituted for them a body of truly scientific material.

In our opinion, there is to be found in this very fact a large and striking source of error, which explains, moreover, the conclusive disagreement of our investigations. In the preceding pages I have presented in outline my doubts regarding the mental condi-

[1] P. 17, *op. sit.*

[2] A first glimpse of the "directory idea" of this sort of study had appeared before this in the *Fortnightly Review*, May, 1883.

tion of the subjects, and I shall endeavor to summarise them thus: It is not possible to repeat such simple notions, which seldom take deep root in our thought!

My personal investigations as well as those of the Society for Psychical Research show clearly that there was almost always, with very rare exceptions: (1) a common intellectual ground between the two persons who constituted the subject and the object of the telepathic hallucination. They possessed—and my cases furnished a striking proof of this—common and intimate intellectual relations, common and dear memories the product of many years; they had had some common love, or friendly sentiment, or kinship, or profound sympathy of an intellectual or more notably emotional nature. A parent experienced the telepathic hallucination regarding his son, his wife, a friend, etc., a woman has an hallucination regarding her fiancé, her father, her grandmother, etc. And the more the person was loved, esteemed, and cherished, and the more he counted upon an established affection, the more frequently did the telepathic hallucination concern him, at least in our experience.

2. The second fact that presents itself is, that the person who constituted the object of the hallucination was always suggested to the mind of the subject as in agony, at the moment of yielding up his breath, or in some cruel and atrocious physical or moral suffering which approximated that of the death-agony.[1] These two facts prove in our opinion that the foundation of telepathic hallucinations is nothing but our psychic life with its complex mechanism and its delicate and inscrutable associations.

In fine, we have to do with a special mental state, a state of profound emotion, a psychic condition which thrills and revives our whole being, for we must not forget that the hallucinations sometimes involved friendships and relations begun in childhood, the period in which memories are fixed forever. We never forget our mother, and the tales told us by grandmother and grandaunt while gazing at the moon, where sleep Pierrot and Columbine of the leg-

[1] We might have given here more averages and additional tables to illustrate our conclusions, but we spare the reader, the more willingly because the extent of this article has already greatly surpassed the ordinary limits of a memoir.

end, and where goodman Noël has his palace, cut in our minds furrows that last for life.

The psychic condition is therefore more intimate than any other whatever, being nothing else than the fabric of our affectional and emotive supports, in fact, ourselves. This special condition is strengthened by another no less peculiar, that of the dying man; and whatever Messrs. Gurney, Myers and Podmore may say of it, to the mass of people a dying man is almost a dead man; it is the most emotional of all states, more so even than death itself. Moreover, there are legends and beliefs and a whole literature of marvels which have extensively popularised in almost every corner of the world the idea of the soul's independence of the body, and have described in detail the mysterious voyage of the soul of a dying man to the land of his birth and to the souls among which he had formerly found repose, friendship, love, or some moments of happiness. The Christian religion, with its admirable philosophical conceptions, has contributed extensively, in my opinion, to the stress laid upon this ethereal voyage of the soul. Both in Roumania and in France, in the course of experiments which I conducted on the psychic condition of those about to die, I found this belief, the existence of this idea of the voyage of the soul of the dying man to his native land, in surroundings which were very far from being in the current of intellectual investigations concerning psycho-telepathy. The death agony, the coma of the dying, is often an indication that the soul is going away, is mournfully setting out towards its kinfolk, to give them the final notice of its departure for the distant land of dreams and ideals, the "other side" of the thinker and the believer. The idea exists, then, and even in the state of a belief, although without the popularity of the other phenomenon, the telepathy of the dying; this is one of the reasons why the hallucinations of this category are much less numerous than in other lines.[1]

These general considerations lead us to believe that the information given by subjects under the influence of this point of view

[1] We shall treat the telepathy of the dead on another occasion.

cannot furnish a scientific documentation unless one has been able to verify it himself and at first hand.

The mental state suggested by such situations, as I have been able to examine it as a personal witness and to follow up the genesis and the evolution of a telepathic hallucination, is an inexhaustible source of errors. The figures and the tables which I have shown and interpreted above leave no room for doubt on this point. Beside these facts, which are of a very special kind, psychic life itself is far from admitting the rigorous tests and the synthesis that are commonly ascribed to it. There are different psychic polarisations every hour, and even every minute, and under the influence of the multitudinous conditions of social life or of conscious or subconscious psychic life the attention usually has the stamp of a dream. Those who have studied dreams will, I hope, agree with me in thinking that there is a perfect resemblance between the logic and the association of a dream and that of the intellectual life when unoccupied, free, vagabond, distraught, or pensive. In these circumstances, then can we count upon affirmations of a past fact to which more or less importance is ascribed, a fact reconstructed perhaps from memories mostly false? Systematic investigations of the localisation of memories and the researches into telepathic hallucinations which we are here giving in résumé have shown us in a manner almost categorical that oblivion causes serious havoc with the precision of facts. False memories value facts of the imagination, and the suggestion of the matter immediately in hand makes new associations, which by virtue of analysis and attention fix the mind of the subject upon conspicuous features of his life, which he associates together consciously or subconsciously in his own fashion. Errors become still more considerable when we are dealing with a miraculous fact, with an event that involves the supernatural, death, mystery; years become days, and the actual inconsistency comes to be regarded as a perfect accord. I was very close to my subject, and even a very choice subject, such as a university-trained Frenchman, a publicist and writer of talent, whom I could observe very near at hand; and I established the fact that he very easily became involved in his dates. Mystery, as well as

the supernatural when actualised, intoxicates and poisons the organism, causing in our opinion a profound amnesia accompanied by an exaggerated self-esteem and the almost complete absence of any new synthesis. The more or less remote realisation of a fact which had never perhaps done more than dance lightly through one's mind produces what I shall call a psychic paralysis, a sort of intellectual blockade which leads us into revery, into exaltation or depression as the case may be.

These errors increase when they are accompanied by beliefs and false opinions which feed day by day the impressions seen or dreamed. Under these circumstances they become almost fixed beliefs and accomplished facts.

And then, *false cognitions!*[1] They swarm in our minds! How then disentangle the reality from the point of view of illusion and of belief? A task of sufficient difficulty when one is master of his subject; how shall one accomplish it when he receives the replies in writing, and from anonymous correspondents at that, who are expected to remember whatever hallucinations they have experienced during the past ten years?

We are, therefore, very far from feeling the same confidence which Messrs. Gurney, Myers, and Padmore accord to their subjects, and our reasons for our position are very serious.

In recalling a fact from memory one is sure, or almost sure, with very few exceptions, even if the event took place but a few hours before, to find some errors. What then of the chances of ten years! How many memories forgotten! What a confusion of sub-consciousness, of precision, of lies, of illusions and of feelings! It will be said, on the other hand, that the phenomenon in question touched a vital fact in the psychic life of the subject. That is true; here we agree: there is in this fact a certain presumption for the evidence, but the sources of error are no less great when a vital feeling is involved which is contained within a vague environment, the details of which are sometimes artistically confused in accordance with whatever caprices have been stirred or provoked afterwards.

[1] On this subject consult the well-planned work of M. Bernard Leroy. Paris: Alcan.

Letters and other documents of this sort do not signify much, for it is necessary to know the mentality of the authors and the psychological conditions when they took up their pens to write or to note down in their studies this or that impression. My information as to the mentality of my subjects and especially the means of testing them have, I confess, given me much trouble, and I am very far from thinking that I have discovered all the intellectual factors that are involved. And I doubt greatly the value of the information given by a letter which narrates phenomena that took place over a period of ten years and emanating from a mind interested in the subject by an inquiry merely picked up in the reading of a journal. There are still other little susceptibilities that might be involved; man never fails to affirm his own existence, and especially the continuity of his identity, as Spinoza observed. One replies to a question out of curiosity, custom, or desire to accentuate a personal belief, self-love, a hallucination, or the like, for we must never forget that there is always a sleeping animal at the bottom of every human soul!

The English authors maintain that the assertions of an illustrious mind moreover have an especial scientific value. This utterance renders a digression necessary. The statement is but partially true. For why, and by what reasoning, attribute to a learned and illustrious person the gift of self-analysis, and especially good scientific and psychological sense, a gift rare enough even among the choicest minds? Mr. X. may be a brave general, an admirable technicist, but totally lacking the power of self-analysis, of knowing his own condition of soul at any given moment, or of recognising the sources of his thought. The same is true of a mathematician, a physician, a poet, a novelist. It must not be forgotten that among the finest minds, particularly among literary people, ignorance of psychic life is most characteristic, and credence is given to any supposed fact whatsoever, as for instance, to a dream or a commonplace saying that is in everybody's mouth. This is the way I explain how it happens that occultism, magic, spiritualism, and all these vague sciences have full sweep in this world of dreamers, where, although the talent and sometimes the gift for

analysis are not lacking, yet they are directed toward other aims, such as: subjects for novels, hair perfumes, rhymed quatrains, etc.

A sad occurrence, or especially the thought of death, may produce amnesia, and, facilitating false cognitions, helps to circumscribe the mental life of the subject with a vicious circle. The thought of death haunts us frequently, especially with increasing age, and in course of time it becomes the *Leitmotiv* to which any sensation whatsoever adheres, and it is aroused by the slightest suggestion. Social environment furnishes the motives by means of its various agencies: publicity, social life, conversation, etc., each of which arouses the individual life of the subject, starting the automatic, vicious circle of thought and with it the notion of misfortune or of death. This is intended to show the necessity of taking into account the ideas among which the subject lives, the psychic, hygienic and other conditions that surround him, and likewise those that surround the absent person, the object of the hallucination. The notion of death haunts a mother that knows her child, or a relative, or a beloved friend to be in a village where an epidemic prevails. This same thought daily conjures up telepathic hallucinations in the mind of a woman whose betrothed is away at war, or during a storm, when she knows that he is in a fishing-boat upon the tempestuous sea. The condition is of vital importance and should be taken into account from the start. Our observations on this point are categorical, and they prove that in 97 per cent. of the cases the ideation of the environment was the source, or rather one of the principal factors, that suggested and produced the telepathic hallucination; in the other 3 per cent. of the cases the family and social ideation of the environment of the subjects could not be as carefully examined as in the other cases.

The example of coincident telepathy mentioned a few pages back, taken at random among many, is a typical case, showing the importance of knowing the mental condition of the subject, and of a previous, intimate acquaintance—or supposably such—with the object of the hallucination. Mme. N. loved her husband; a sweet and calm life of more than thirty years had glided by; she knew her husband's nature and had repeatedly praised his courage.

He had met with quite a number of accidents during his life, and had always got out of them very nicely. He had jumped several times from his carriage when the horses had run away. So much for his character. At the same time she knew the horses,—nervous beasts that took fright at any noise. And thirdly, she knew that the coachman was a drunkard, and that he had been in the habit ever since he entered their service of taking a drop too much of the town alcohol. The weather was bad; inundations were threatening, and Madame N.'s husband was rather old, already entering his seventy-second year. Several different times Madame N. had counseled her husband to prudence, and especially not to mount a horse, nor to expose himself to danger in any way. Before leaving he had greeted her with a smile, telling her not to worry; that other accidents had happened along his way before but that he had always come out unscathed. And besides, business was urgent, and she must yield to the inevitable. Madame N. remaining behind, busied herself with her household duties but was by no means reassured; the weather, and especially her special mental condition, contributed largely to render her more melancholy. However, the hallucination took place before the fact occurred, and the psychological explanation is very plausible. Having urged Madame N. to analyse herself, she had confessed to me that she believed that her husband would return before breakfast, as was his general custom. Her sub-consciousness was at work, however, and aided by the somatic and automatic intellectual life of the subject concerned forced itself upon the attention as a credible hallucination, startling us by its spontaneity, although in fact it was the expansion of a sub-conscious ideation, which had escaped the attention of Madame N., as is the case with all persons who experience credible hallucinations. However, this variety has been less numerous. As for the others, our figures have shown that they exist only in the imagination of the subjects and that they are based on no reality whatever.

XI.

Unfortunately it is not sufficient to indicate the name of an author, his address, his nationality, his titles, in order to have a

scientific documentation of a fact, and we believe that our arguments have sufficed to call the attention of the reader to the slight guaranty of veracity offered by such investigations. Furthermore, let us not neglect to criticise these investigations as they stand. They entertain, they deceive, they secure titles for those who conduct them, and with rare exceptions they deserve to attract attention, and then they should be restricted to a small and local number of subjects. Wholesale facts are more or less striking, it is true; but there are so many extraneous matters involved that unfit them for any real use, and they require then so much careful examination and extensive individual study.

We find this same condition of easy credulity in the evidence collected by another scientist, M. Camille Flammarion, who in reporting an investigation conducted by himself on the telepathic manifestations of those about to die writes: "The striking thing in all these accounts is the sincerity, the conscientiousness, the frankness, the delicacy of the narrators, who are so careful to say only what they know and just as they know it, neither adding nor withholding anything. Every one is the servant of the truth!"

Charming words, and such solemn serenity![1] M. Camille Flammarion demonstrates that he has a tender heart, that the man who thus reasons is a man of sentiment, but who forgets all our abundant evidence on the psychic mentality which has been collected with incomparable perseverance throughout several decades in all the hospitals and laboratories of the world. To put such trust in the "sincerity," the "frankness," the "conscientiousness" and the "delicacy" of the subjects reporting is to confess squarely that the investigation has been conducted like the others we have been criticising. For it is not sufficient to be a worthy man and an honest in order to deserve credence in the analysis which anyone makes of a certain mental state, x, x′, or x″; honesty has nothing to do with the matter. Unconsciously one sins by lack of ability to analyse, to observe adequately, to concentrate the attention, etc.; one fails to fix his impressions well, and he fails still worse in recalling them.

[1] Camille Flammarion. *Des Manifestations Telepathiques des Mourants.* Nouvelle Revue, CXX. 1889. P. 456.

M. Camille Flammarion had launched his investigation into the world by the channel of the *Annales*, by that of the *Petit Marseillais*, and of the *Revue des Revues*. In the *Annales* it appeared in the issue of March 26th, 1899, and in the other publications the months of June and July. It was formulated as follows:

"Will our readers have the kindness to send us a simple postal card replying with Yes, or No to the following questions:

"1. Did you ever experience while awake the distinct impression of seeing a human being, or of hearing him, or of being touched by him, without being able to refer this impression to any known cause?

"2. Did this impression coincide with a case of death?"

M. C. Flammarion received a large number of replies more or less detailed, of which a large number were unworthy to be discussed as evidence, and he retained 782 of the affirmative answers as important; there were altogether 4280 replies, 2456 being negative and 1842 affirmative.

Reviewing this investigation we shall permit ourselves to criticise it for the suggestive and defective way in which the questions were formulated, and secondly because the author has made a selection of his evidence. From the scientific point of view negative answers are no less valuable than affirmative answers. And in fact, what important reply could the readers of M. C. Flammarion's questions make to his demand of Yes or No? This recording of negations and affirmations could not at the best do more than give an idea of a vague report, at least in our opinion, of the public opinion of educated people.

We have a particularly high esteem for the author of "*L'inconnu*," and as a devoted reader we owe him a great debt, but he must permit me to criticise him as a psychologist. In psychology figures that are not accompanied by data regarding the mental state and the psychologic conditions under which the figures were made are subject to several criticisms, and especially so from the scientific point of view.

Let us note in passing the very just remark of M. Flammarion, that "a great number of these facts—in telepathic hallucinations—

are subjective, take place within the brain of the witnesses, even though determined by some exterior cause. A great number also are hallucinations pure and simple. What they teach us is, that there are still a great many things we do not know; that there are in Nature unknown forces which are interesting to study."[1] And I would add on my own account, and I believe that M. Camille Flammarion will agree with me, that there are still more unknown forces and phenomena scarcely studied in the brain of man, in our psychic life.

At the Congress of Psychology in Munich several communications were presented on the subject of telepathic hallucinations, together with discussions and communications as interesting as they were ingenious, in which the participants were: Dr. Bager-Sjögren of Upsala, Mr. and Mrs. Sidgwick of Cambridge, authors of a rich and remarkable mass of evidence on telepathic phenomena, Dr. W. V. Dechterew of St. Petersburg, Edmund Parish of Munich, and M. Charles Richet of Paris. The conclusion seemed to be that "it is very probable that there are no credible hallucinations." Knowing only the abstracts of the communications presented to the Congress I cannot dwell upon their methods nor discuss their evidence. However, our remarks in the present paper will apply to them in part also and to their conclusions which are but a continuation of the remarkable observations in the investigation of Messrs. Gurney, Myers and Podmore.

XII.

After having interpreted our evidence, a new question arises: Can we conclude that telepathic hallucinations exist as well-defined psychic phenomena, or are they only sensorial hallucinations based upon no positive, actual data, and occurring only by chance? The explanation of the phenomena depends, of course, upon which of these two hypotheses is accepted.

Our evidence proves, first of all, that the coincidences seem fortuitous rather than dictated by any biological or physico-psychic

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[1] The memoir quoted, p. 458.

laws, and secondly that they are more numerous than has been claimed. The English authors conducting the investigation of telepathic hallucinations resorted to the calculus of probabilities in order to show that the results obtained belong neither to the domain of chance nor to that of fortuitous coincidence. In fact their mathematical calculations based upon the average of mortality, and upon the probability that a person should have experienced a hallucination during the period of 12 hours coinciding with the death of a friend or relatives etc., show according to their opinion and according to their algebraic ratios, that if hallucinations were due merely to chance, there would necessarily "take place in a group of 300,000 persons, in 12 years, 182,500 hallucinations, that is to say that three persons out of five would have experienced a hallucination during that space of time." But from their investigation the contrary is shown; telepathic hallucinations are much less frequent, and exceed the probability expressed in more or less imaginary figures.[1]

Statistics and mathematical arguments deceive rather than instruct the eye. Setting aside the figures, and the probabilities more or less reduced to a common fact, as well as special mathematical reasoning, the calculation is not strictly exact, owing to the absence of the chief statistical data. For, in order to calculate such a probability mathematically, it would be necessary to have numerical data concerning the probability of the person's death or illness, numerical data concerning the state of his health, concerning his environment, concerning the mortality of the country and town in which he was living, as well as such data concerning the person experiencing the hallucination, at the time of the observation, in other words, data concerning the probability of mortality, eliminating as far as possible the tabulation and vague generalisation of statistics as commonly made. Not being able to obtain these data about my subjects, I have not dallied with this little mathematical calculation for any class of my subjects. I simply insist on the value of these manifold factors, which are already beginning to receive the atten-

[1] On this subject see Chapt. X. on the "Theory of Fortuitous Coincidences."

tion of statisticians; mortality varies with the social class, with age, and with social conditions. The probability changes according as the person lives in town or in the country; as he is 70 years or 20; according as he is sound or feeble. Only when such statistics and still others are made, can the psychologists make use of the dates, not forgetting however to take into account and to weigh well the personal coefficient of the statistician, of the observe, and of the observed. The calculus of probabilities would still be superfluous, for the credibility of these 48 cases of coincidence out of 1325 cases investigated and connected with 34 persons, show sufficiently that they are out of the bounds of probability.[1] However, what would be the value of this probability when it is in flagrant contradiction with the most elementary biological notions? In an experiment where only 2.5 per cent. or even 3 per cent., or again 0.3 per cent., or no result whatever was found, probability does not exist scientifically, so to speak. Why not hold to this simple confirmation of scientific common sense and why search for special reasons which confuse the results by introducing into the calculation a considerable number of unknown quantities? I have studied long on the part due to the calculus of probabilities and to these scientific data, and despite the vital problems involved, and despite the value of these discussions of mathematical philosophy, I incline to believe with my illustrious master, M. Bertrand, who attributed to it less value than to the data of simple common sense. Apparatus is full of temptations, and in our days the psychologists of the new school intoxicate themselves with a certain number of mathematical formulæ instead of reasoning simply, and the sight of these probabilities, derived no one knows very well whence nor in what manner, hypnotises them to such a degree that they treat our mental acts like numerical data, and the development of our wretched psychic analyses like precise measurements, like millimeters read by the

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[1] Roumania has a very large percentage of mortality. The most recent statistics published, those of 1894, show that in 1893 there was a mortality of 31.5 deaths for each 1000 inhabitants, while in England there were but 16.6 deaths per 1000. See *Mouvement de la population de la Roumanie en 1894, par* Leonida Colescu, 1 Vol., pp. 95, iv. Bucharest, 1900.

vernier. Speaking from the point of view of biology and reckoning with these multitudinous conditions of a psychical, physical or statistical nature which we have treated in the preceding pages, it seems to me a little premature to attempt to apply such a learned mathematical process, which, moreover, has yet to be formulated precisely and scientifically, to such vague and intangible data.

Telepathic hallucinations, judging from their considerable number, from the degree of their illusory subjectivity, and from the small proportion of credible cases, do not seem to hold rank as well-defined psycho-mechanical phenomena acting independently of the sensorial agent. We do not consider this proportion of credible cases as a matter of chance; it is a fortuitous coincidence which in our opinion is easily explained.

Comparison has been made, and properly, between telepathic phenomena and the phenomena of mental suggestion and of the transmission of thought at a distance. The fine investigations of M. Richet, which I have continued on a large scale, present among others most valuable evidence. Hallucinations are purely subjective phenomena depending on ideation directed consciously or unconsciously by any association whatever of automatic or voluntary ideas. All the facts discovered in telepathy have taken place under very special, yet very definite, conditions. The persons concerned are always absent and far removed one from the other; the conditions are always emotional and the persons are intimate acquaintances, relatives, friends, lovers, people who have lived a long time together, and who know each other thoroughly. Telepathy always concerns serious misfortunes, mortal agony, the state of approaching death, and the situation recalls the person in his suffering with his familiar gestures—our investigations furnish a striking proof of this—with almost the same garb, the same accent, the same physiognomy by which the person had been known despite the time and space separating the persons and the difference of conditions from the reality, whatever it might be. Our observations have furnished us definite evidence on this point and notably have shown a conclusive discrepancy between the actual physical conditions of the subjects in the credible cases and the conditions seen in the

hallucination. In the English investigation, despite the paucity and inaccuracy of the tested evidence, we may find this same predominant shade of subjectivity in the persons who experienced the telepathic hallucinations. They have a personal stamp and seem to be the exclusive product of the thought of the subjects.

Some of these cases of fortuitous coincidence can in my opinion be explained by what I shall call "pre-established intellectual harmony," to borrow the terminology of the philosophy of Euler and Leibnitz on the relation of the soul with God. In practical life our mental states harmonise in conformity with our impressions, our instincts and other intellectual or bodily springs of action; this harmony is generally controlled by emotion, by the efficient energy, the fundamental and primitive substance of our being. From the age when reason begins to formulate any sort of psychic synthesis our spirit is always trying to be in harmony with other minds in conformity with our desires, our emotions and our intellectual motives. Puberty comes later with its almost morbid expansion of the desire for harmonisation, and finally adult age arranges and models our sympathies in accordance with already established psychic conditions.

XIII.

At the bottom of each one of us there is an unsatisfied capacity for sympathy, a melancholy tenderness, which persists despite our learned reasoning, despite our psychologic analyses conducted with marvellous erudition. Beside this emotional foundation slumbers in our soul so to speak a dying being, a mystic. This is the very essence of our being! Transmitted by heredity this casket of mystic sentiments, as it were an elemental state of our consciousness, disturbs us from the moment when we have succeeded in establishing a more logical relation between the vital "ego" and the mysterious "non-ego." The "non-ego" haunts us, disturbs us and at the same time unconsciously or subconsciously this refrain comes like a dominant motive into our thought, now tender, now melancholy, and now categorical and cruel. It is the patrimony of the superstitions of the ancients, the synthesis of their fears, their mysteries,

their ignorance and their terrors. For every belief has something more at bottom than "the infantile spirit of the savage," despite the opinion of Tylor, Spencer, and Sir John Lubbock; it rests upon deeper psychological facts. A belief is the elementary form of a whole system of metaphysico-biologic dogmatism. Our hair grows gray, age separates us from our years of indifference, the eternal "What am I?" "What do I know?" and "What is to become of me?" press upon our spirits with ever-growing persistence. Here we have the whole past of humanity speaking within us!

This state of mind assists largely in directing our thought toward that condition of harmony, toward those ties of sympathy which by their charm, their confidence and their tenderness will put more of reliability, of self-denial and of trust into our human relations. To be solitary is the mark of a genius; it is the possibility of thinking, of struggling against the "barbarians" of every sort who invade the sanctuary of our thought. But how many of us, even among those who are thinkers, will be able to endure that state of soul? Exceedingly few. We seek for affections, and we find them; we retain them as part of a cherished patrimony of our past, of our remembrances; we never cease to think of them, and most of all when we separate one from another.

The purely emotional or intellectual affections, as the result especially of a life spent together by the persons concerned, would finally establish what I shall call the *psychic parallelism* which consists in a sort of pre-established harmony. There is produced an *intellectual mimetism*, quite analogous to expressional mimetism. In this connexion I am able to cite certain observations which I have been making for a long time, and which have demonstrated to me the delicate affinity that may exist between two parallel psychic lives. Lovers are a typical example, likewise mother and child; knowing each other well, each knows even at a distance exactly what the life of the other is; they can conjecture each other's emotions and annoyances, and in the long run they can comprehend each other's intellectual state, especially in what we shall call critical situations. Under the influence of similar conditions different psychic lives react about in the same way, and especially

after a long life spent together two persons can come very near to knowing each other. The mental life constitutes a vicious circle, and a time is apt to arrive when our intelligence is closed to all suggestions from without; we are then always the same, almost identically the same, and easily identified in our acts and thoughts. With oncoming age a stereotyped mental form is established, and the manner in which our mind retires within itself begets of itself a sort of petrifaction of the immediate surroundings in which one formerly lived, rather than of those in which he is living in his later years. Our means of intellectual communication become exhausted very quickly, and conversation often falls into ridiculous absurdities, betraying in most cases only a lessened mental power which remains unchanged and is extremely silly because of its frequent repetitions.

People often separate under the influence of strong emotions; the idea of parting and of absence makes them think of death and of sorrows; these thoughts are an endless source of melancholy. Who knows whether the beloved one will return, who knows whether or no he is going away for all time? Separation is often for a long time, if not forever, and the emotion is proportionate to the distance that separates those that love. It is necessary to take into consideration also the age and the mental and physical condition of the absent one and of the one remaining at home, in order to understand the mental processes of those that are separated. They may remain for months or even for years under the influence of that parting, and emotion is fed by the beliefs of the subject and the other influences of the environment in respect to ideation and all other suggestions. If the person is more impressionable, the emotional state is still more sensitive and still further disturbs the personality.

Such being the case, a fortuitous coincidence is very likely to occur in which the subject and the object of the hallucination experience this so-called telæsthesia. The unknown is always perceptible in the hypnotic state, and we are all like the sailors' wives that stand for hours upon the shore, searching the infinite, their eyes fixed upon the horizon, in the belief that they may be able to

discern the outlines of a ship. A flock of gulls is taken for the sails of a boat, as at other times we try to guess the meaning of that bluish haze floating upon the horizon. Thus a person has a telepathic hallucination every day,—thinks the absent one speaks, hears him, sees him, smells him, or is touched by him. Generally disillusion disconcerts us; the wind was whistling outside; the echo of his voice resounded in our thought as a memory; or a tactile sensation became vaguely localised in some part of the body under the impulse of a plasmic image. At times, in the proportion of 2 to 100, it happens that we hit it right; the news we had of the absent one, the knowledge of his surroundings, his precarious health, his psychic life, etc., had prepared us beforehand to have a mental hallucination corresponding to his own. Knowing his character, his psychic modality, his doubts, his desires, his fears, and his mental sufferings, we can very closely estimate his mode of life. Our subconsciousness, with its slow, imperceptible processes, had prepared the way for this state of mind, of which otherwise we know nothing, and we are surprised when a sensorial image spontaneously presents itself to our thought, or passes away quickly as a telepathic hallucination. Then we do not hunt for causes, nor for the springs of thought; we see only the coincidence, and a single one in a hundred suffices to create a legend, to warp judgments and memories, and to suggest in the ideation of the social environment of the subject the more or less credible probability of similar sensations and similar prognostications. And as death is the greatest sorrow than can come to us, we often see the absent one dying or ill, especially if the occupations and needs of life do not snatch us from such suggestions—which we classify subconsciously,—and if they do not make us forget the meaning of life, our affections, our desires, our mental suffering. The spontaneity of the fact seems surprising, indeed even miraculous, and we do not stop even for a moment to consider that we are here dealing with a slow ideation, thanks to that pre-established harmony and that psychic parallelism of which we have already spoken. I possess some conclusive evidence on this subject, and I have been able to observe personally in thirty-seven hallucinations,

as well as in the great majority of my cases, the progress of this slow, subconscious ideation. I cannot forbear to cite a personal experience. At the time of my father's death, two years ago, I had the very evening of his death the telepathic hallucination of his suffering simultaneously with Mme. V. On entering my home, Mme. V. called my attention to a peculiar odor in the room. "It is just like that at your home at B.," she said, "it smells like quince." In fact, in my country and in my home it was customary to put quinces into the bedroom and to keep them there during the entire autumn, perfuming the air with the fragrance of quinces. At this recollection I saw my father dying. The next day I received a telegram in which my mother informed me of my father's serious condition, begging me to come as quickly as possible. I was separated from my father by a three days' journey by rail. My father had in fact died toward morning, and during his last hours, all night long, he had constantly called for me. Between the moment of his death and our hallucinations there was according to my calculations a difference of seven hours. His last moments had been calm, and being a believer, he had shown a truly Christian resignation. He had had several syncopes. And what are we to conclude from this fact? In accordance with the current reasoning no other conclusion is plausible than telepathy as a telæsthetic phenomenon, and the fact might have been cited as a credible hallucination. Would this hallucination have corresponded with any of the comatic conditions at the moment of death or to the phenomenon as a whole? A difficult problem, with new conditions which the experimenter must take into account; the manner of death is so variable and the death struggle may last from several weeks to a few moments. I recently had the opportunity of testing this experimentally in investigations which I undertook regarding the "ego" of those about to die, and which I am pursuing at present.[1] I took into ac-

[1] I take this opportunity of thanking Dr. Toulouse for his great kindness in placing at my disposal his model staff of the *Asile de Ville-Juif*. There I had the opportunity, not only to pursue on the study of psychiatry, but to observe and gather a whole mass of psychological evidence, which would have been difficult, if not impossible, to get elsewhere. I tender my profound gratitude from the depths of my heart.

count experimentally from the first the value of this psychic parallelism and then the difficulty of catching the true moment, which in the opinion of adepts in telepathy would be the cause of the hallucination. The dying man calls for his son, his mother, or his family when he feels perfectly well; and his psychic condition is deeply shaken when he approaches final dissolution, and when he nevertheless retains his clearness of mind, as for instance in the case of a tuberculous patient, and gives no perceptible sign of his emotive thoughts. One may say the same thing of the somatic conditions of the genuine deliriums with their peculiar panoramic vision. The problem, therefore, is altogether different, and one cannot scientifically establish by the aid of the calculus of probabilities any quasi-mathematical correspondences. My case of telepathy can in my opinion be explained in another way. I knew that my father was weary and ill; I knew his mental state very well, and I was accustomed to follow his thought from afar. As he was seventy-three years old and ailing, I had worried about him for a long time, and at the bottom of my heart I had been expecting from day to day a word from my mother announcing that his condition had become grave. Though he had rarely been sick in his life, he had been suffering for some months from the results of a cold. I had seen him a few months before; he was feeble and our separation at the time of my departure for Paris had deeply impressed me. He wept and realised that his vigor was departing. He told me that he had a feeling that he would never see me again. All these impressions moved me profoundly and I still feel the thrill of that emotion. From time to time the letters which he wrote me were melancholy, and I recognised in his touching words the language of a dying man. He wrote me customarily twice a week. For three weeks I had received no letters from him, and I had several times experienced a hallucination that he was ill. From time to time he suffered more especially and for some while he had remained in his room upon the orders of the doctors. Preoccupied by my work and my investigations I nevertheless did not forget my father, and in my odd moments I found myself thinking of him and his illness. All my memories of childhood were as it were polarised about the state of

his health. I had never experienced a death in the family that could touch me closely; the death of my sister when I was quite a child had left with me only some vague memories. The idea that my father was going to die disturbed me, and yet I kept regarding it more and more as a reality. Here I will add that it is necessary to take many precautions in observing an hallucination concerning the critical physical or moral crises of an individual. A sick man, seriously sick, is always thinking of his family, always lingering over his memories and his affections, and there is a great probability that a fleeting thought on our part might correspond to his constant mental condition. Take the case of a patient suffering with diabetes with its many crises, a gouty person, a victim of ataxia or of some mental malady which has baffled those about him and even the physician who prescribes his remedies! In such a case the probabilities of a coincidence become still more numerous and without regard to what coincidence is probable; the automatism of psychic parallelism explains all without making it necessary to call in telepathic forces.

The last letter from my father was, as I have said, sad; some days before his death I received from him a letter written to him by a little nephew. This circumstance had troubled me much. He wrote to me by the hand of another when he had been so fond of chatting with me by letter! I suspected that the final catastrophe was at hand. It came suddenly, at the moment when I was preoccupied by a paper that I was revising and which had for two or three days interrupted my telepathic absorption in the condition of my father. However, I had chatted frequently with Madame N. regarding my father, and several times I had expressed to her my fears; or rather, one day I had expressed my impatience at receiving no letter from my father; I had even had a vague hallucination of his soft blue eyes. The evening that he died, and perhaps at the very moment when he was yielding up his soul and calling upon me in words of tenderness, I had an hallucination of his condition. I saw him just as I had left him, with his usual expression and his motions, and he seemed much changed. One of his ardent desires expressed during his life was to have me near him at the

moment of his death, and as he died he expressed his regret at my absence. . . The spontaneity of the hallucination had surprised me a little, and the mysterious background of night always gives a chaotic nimbus to our thoughts, our griefs, and to our ideas, especially our sad ideas. Upon analysing myself, trying to fathom my thought I had discovered this slow ideation which I was able to identify amply. The mysterious is in the main only the foggy expression of a perfectly simple conception. I have had the opportunity of tracing out trains of ideation with documentary support in the great majority of cases, and the conviction has established itself within me that there was in none of them a case of telepathy, but only of peculiar subjective conditions.

In brief, our observations and our evidence lead us to conclude that telepathic hallucinations do not exist independently as well defined phenomena, and rest upon no established mental facts. They are not at all phenomena of telæsthesia, and they exist more frequently than is generally believed, but are based upon peculiar mental states. The number of credible cases is extremely small and very far from reaching the rank of any sort of biological fact. Nevertheless, the credible cases are not all due to chance; there are many among them, even the great majority of these credible cases, those that can be explained easily on the basis of a sort of "pre-established intellectual harmony," that is to say, can be explained psychologically.

We do not claim to have solved a problem so complex as that with which we are dealing; but it seems to us that there is some truth in our evidence and our arguments. Why inquire even whether telepathic hallucinations exist in a given proportion or seek out the supersensible causes and the explanation in phenomena that border upon the marvellous? Nothing is impossible in the domain of biology, and I am an adherent with all my heart of the noble ideas advocated by M. Richet in the page which we quoted from him at the beginning of this paper, but we think that before searching for the explanation of miraculous phenomena it is proper to try to fathom this other unknown realm, "our ego," which is no less extensive and at the same time extremely impor-

tant, our mental life, our cerebration with all its forms and its intellectual and somatic modalities. This realm of the unknown is more important than any other, and psychologists, spiritualists, telepathists, occultists, and even physiologists would but advance the problems which they study, if they would devote more attention to them. There are many enigmas proposed to us by this sphynx, and many mysteries which she hides! Does not the subconsciousness with its numerous combinations and its sensorial alimentation constitute the foundation of our being, our waking as well as our dormant thought? It is very fine to break through the beliefs of science, and to open new paths, and for my part I see no inconvenience in the existence of telæsthesia, for there are many other phenomena of a physical nature which may serve as an example. But it is necessary to prove it, and if we do not prove it we must not venture to hunt for comparisons among phenomena of a physical nature when we do not yet possess sufficient knowledge to know to what extent and in what order of ideas the psychical phenomena are comparable to them. We know at the most that there is a close relation between the two orders of ideas, but that is all. Before breaking through the cranial envelope of our brain and admitting that our thought flies in space in the form of a telepathic vibration and countenancing the belief that our thoughts can thus make their way to a distant goal, let us study incessantly this world of "ours," which is more important than any class of physical phenomena, and let us not become intoxicated with this new metaphysics which is characterised by its love for figures, for too great precision, and for mathematical calculations based upon unreliable data.

N. Vaschide.

Paris, France.

SPIRIT OR GHOST.

COMMENTS UPON SPIRITISM AND SPIRITISTIC INTERPRETATIONS OF PSYCHICAL PHENOMENA.

SPIRIT originally means "breath," being derived from the Latin *spirare*, to breathe; and breath being the most obvious indication of life, the word "spirit" came to denote (like so many other words of the same significance, such as *animus*, *anima*, πνεῦμα, ψύχη, etc.) "the principle of life." When a man died, he ceased to breathe, and with his breath, life was gone; accordingly the breath was naturally assumed to be that mysterious something which is endowed with life, consciousness, and intelligence.

The idea of spirit, with the great masses of the people to-day, is still the same as it was in the days of savagery, and the philosophical conception of spirit has developed from the popular and primitive notion simply by eliminating the coarse and materialistic features of the belief in defining spirit as that which constitutes man's intelligence. Descartes says: "The essence of spirit is thought."

Since we are still influenced by the savage notion of spirit, and because, in spite of its errors and crudities, the savage notion contains a deep truth, being in fact based upon a superficial observation of events that form the bottom-rock of our psychological race-experience: it may be wise to consider the logic of primitive man. His notion of spirit is influenced by his dream-experiences. When he sleeps, the body is resting, but his imagination remains active, he dreams; and in his dreams he goes hunting or fishing, and meets his friends and foes in combat. His spirit accordingly

is, in his judgment (and who will deny that he is right!), made of the stuff that dreams are made of; and the most remarkable thing is that the dead too appear to him in dreams.

The *Iliad* contains a description of the shade of Patroclus visiting Achilles, which may be considered typical. In Pope's translation it reads as follows:

"Hush'd by the murmurs of the rolling deep,
Achilles sinks in the soft arms of sleep.
When, lo! the shade before his closing eyes
Of sad Patroclus rose. He saw him rise
In the same robe he living wore. He came
In stature, voice, and pleasing look the same.
The form familiar hover'd o'er his head,

'And sleeps Achilles (thus the phantom said),
Sleeps my Achilles, his Patroclus dead?
Living, I seem'd his dearest, tenderest care,
But now forgot, I wander in the air,
Let my pale corse the rites of burial know,
And give me entrance in the realms below.'

And is it thou? (he answers) To my sight
Once more return'st thou from the realms of night?
O more than brother! Think each office paid,
Whate'er can rest a discontented shade;
But grant one last embrace, unhappy boy!
Afford at least that melancholy joy.'

He said, and with his longing arms essay'd
In vain to grasp the visionary shade!
Like a thin smoke he sees the spirit fly,
And hears a feeble lamentable cry.
Confused he wakes; amazement breaks the bands
Of golden sleep, and starting from the sands,
Pensive he muses with uplifted hands:

"'Tis true, 'tis certain; man, though dead, retains
Part of himself; the immortal mind remains;
The form subsists without the body's aid,
Aërial semblance, and an empty shade!
This night my friend, so late in battle lost
Stood at my side, a pensive, plaintive ghost:

Even now familiar, as in life, he came;
Alas! how different! yet how like the same!'"

In dreams we experience the same sensations as in waking. Dreams may be more or less dim, more or less coherent, but the reality of our perception is the same, and the savage naturally infers that the dream-phantoms as well as ghosts are as real as the persons whom we meet in actual life.

Such upon the whole is the nature of spirits according to the common notions of almost all the nations on the face of the earth, at a certain period of their development.

Dreams in sleep are supplemented by dreams in a waking condition, i. e., by hallucination, be they caused pathologically by a diseased condition or by narcosis. The spirit of a man is thus assumed to have a shape which closely resembles his body. It moves about, yet the substance of which it consists is supposed to be imponderable like air or ether. It is not hindered by the laws of gravity; it can pass through closed doors, and no prison can hold it; it can hover in the air and can travel over immeasurable distances in a moment. Though invisible to the eye of mortal man, the spirit can reveal its presence whenever it chooses or conditions are favorable. It may appear in bodily presence to one and may speak to him, while others that stand by can see nothing but the impalpable air. An instance of this kind is represented in Shakespeare's *Macbeth* and in the queen's bedchamber scene of *Hamlet*.

It is by no means impossible or due to accidental coincidence when several persons see a ghost. Not only are men of the same belief and education and under the same influence of external conditions apt to interpret a strange sight or noise in the same way, but suggestion transfers the interpretation of one observer to others, and thus it would seem that the opening scenes in *Hamlet* are true to nature. The sentinels first see the ghost; young Hamlet is called, and being prepared for the occasion, he not only sees the apparition but speaks with it.

There is no need here of further entering into details, but we may incidentally mention that the several savage tribes have

worked out each one in its own way quite complicated systems of psychology, which are peculiarly elaborated in the ancient Egyptian religion.

The ancient Egyptians distinguished between BA, the consciousness-soul; KA, the double or dream-body; and KHU,[1] the spirit or intelligence.

During life the BA together with other spiritual factors inhabits the KHA or perishable body, but it is characteristic of the Egyptian religion that for the sake of the welfare of the BA the body must be preserved; hence the custom of mummifying the body (which is now called SAHU or mummy) and rendering the tomb an eternal abode, PA T'ETTA, i. e., the everlasting house.[2]

To us who have been trained to speak of man's body, soul, and spirit, the Egyptian conception of seven or eight souls seems queer; but we must bear in mind that the Egyptians are by no means isolated in their psychological views. The later Taoists of China, for instance, believe that man has three *hun*, souls, and seven *p'o*, spirits,[3] and how many there are among us who even to-day think that soul and spirit are two different entities, and that the spirit is a kind of mediator between body and soul. As a matter of theory, there is very little difference between two souls and

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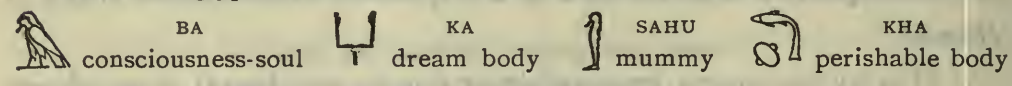
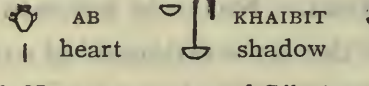
[1] The transcriptions *Xu* and *Xa* are perhaps perferable.

[2] The hieroglyphic emblems of man's spiritual factors are as follows:



In addition there are:



[3] *Hun*, soul (No. 5244, p. 534 of Giles's and p. 269 of S. W. Williams's Chinese Dictionary). *P'o*, animal spirit (No. 9420, p. 924, Giles, and p. 711 Williams). It is stated that the *hun* corresponds to *yang*, the male or heaven principle; at death it goes up to heaven. The *p'o* corresponds to the *yin*, the female or earth principle, and at death goes down to the earth. As to the three *hun*, it is stated that after death one goes to heaven, one to the earth, and the third stays with the corpse. Again it is said that one represents the vegetative, one the animal, and the third the moral principle; the first and second die with the body, while the third is immortal. The seven spirits are the five senses and two more functions representing the action of the limbs. The latter explanation is mentioned by Williams, p. 711.

seven souls; in either case it is a plurality; and if we hypostatise faculties or powers such as intelligence or mind, the heart or tendency to emotions, the vital force, etc., we may be found to be not so very far away from either the Egyptians or the Chinese.

The several similarities, totemism, animism, etc., of the Egyptian world-conception to that of the American Indian do not prove that Egyptian civilisation has travelled in prehistoric times to the new world, but show what the American Indian would have become, if his intrinsic development had not been interfered with by the advent of the white man. The culture of ancient Egypt has just emerged from the prehistoric animism, and our own condition is just a few steps farther advanced. One of my missionary friends, a highly cultured man, is so delighted to find among the savage Indians all the elements of a belief in an immortal soul, the aspirations of moral ideals, and the trust in a happy hereafter, that he exclaims full of enthusiasm: "Surely Christianity need not wait long with the precious message for which these our noble aborigines seem more than ready!"

Savages believe in the actuality of their dreams; they think the spirit frees itself from the bondage of the body and roams about at pleasure. Dreaming, therefore, is a spiritual state, and information received in dreams is attributed either to good or to bad spiritual powers. Hence the sacredness of dreams which is still a noticeable feature of the New Testament.

Hallucinations, not less than dreams, were considered as spiritual ecstacies and were supposed to be caused by some supernatural presence either as a divine inspiration or through demoniacal possession.

Narcotic drugs and drinks were naturally regarded with religious awe;[1] the Pythian priestess at Delphi inhaled the vapors of the fissure in the ground, and the medicine man of the Jepurina in South America[2] enters into a trance by taking narcotic snuff.

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[1] See Wilhelm Bender, *Mythologie und Metaphysik. Die Entstehung der Weltanschauungen im griechischen Alterthum.* 1899.

[2] *Zum Animismus der südamerikanischen Indianer.* By Theodor Roth, page 5.

The worshippers of Dionysos indulged in wine, because intoxication leads to the spirit land.[1]

Man's interest, however, does not center in anthropological nor in historical problems, but in the more important and living question whether or not the spirit of man is a reality; further, in case of an affirmative answer, what kind of reality spirit is, what it can accomplish, and whether or not and in what form it will live on after the destruction of the body. Having frequently discussed the positive aspect of the problem, we propose in the present article to deal with a special aspect, viz., the theory of ghosts, which conceives the manifestations of spirit to be produced by beings of a sublimated substance. We shall try to appreciate the arguments of those who believe in ghosts and state our reasons for begging to be excused from accepting their views.

There is an inborn desire in man whenever he sets out on a journey of any kind to reach at once by the most direct route the end and aim of his travels. Thus it is but natural that we have a tendency to jump at conclusions; and seeing how in the process of development we have been obliged to surrender one after another our cherished superstitions as to the nature and faculties of the spiritual part of man, there is a powerful faction among the scientists who say there is no soul, no spirit, no mind, but only brain functions; psychology will have to be reduced to physiology and the whole fabric of our *Geisteswissenschaften* (as Hegel called them) will find its final explanation in physics, as molar and molecular motions of mechanics, or as ether vibrations of electricity. But we are not prepared to follow the materialist because he overlooks the most obtrusive facts and builds his theory on a vague assumption.

We grant the truth that there is no reality outside of the dreamer that corresponds to his dream, but for all that we insist

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[1] The Lord's Supper was celebrated with water in Africa and in some parts of the Roman empire where the people believed in total abstinence from strong drinks, but the belief in wine as spiritual food was so strongly impressed upon the minds of the people in Greece and Italy, that in the Roman church the practice of using water was rejected as heretical, and the custom of serving first a mixture of water and wine, and then pure wine, became established as orthodox.

upon the reality of the dream and the spiritual nature of the dreamer.

Our sensations are due to sense-impressions which awaken in our mind the memory-pictures of former sense-experiences, rousing a number of expectations and resulting in sense-images possessed of meaning. I glance out of the window and my eyes rest upon a tree. I do not see the retina picture in the eye, I see the tree. I am not conscious of the brain-structures that help to build up the image and make me see it as a tree; I have the result only: I perceive the tree outside; and thus the sensation becomes a perception. I see the tree with trunk and branches and leaves. I have a notion as to what to expect in case I should touch it, and I can verify my expectations by experiment. I see the tree at a distance which I can only approximately measure in figures, but of which I have a very definite conception. A cat, or a monkey, or a dog, can measure distances neither consciously nor in figures, but unconsciously, yet with great exactness, so as to adjust their jumps (or chickens their pecking) with great precision where even an insignificant misjudgment would make the whole movement end in failure. These mental images are actualities; they are the stuff that psychic life is made of; and dreams, if considered in themselves without reference to their objective validity, are in all essentials exactly the same as sensations; they may be now dimmer and vaguer, now brighter and more beautiful, but are always the same in kind. They are sensations.

No wonder that dreams are taken as realities by the uncritical savage who has not as yet learned to discriminate between sensations and visions. To him the dream-life is the higher life because it is not encumbered with the gross materiality of our normal waking states; it is more spiritual and nearer to the divine.

Schopenhauer, recognising the kinship between sensation and dreams, says that man's conception of the world belongs to the class of dreams; it is appearance. And this is true, but we would reverse the order and say that dreams belong to the class of sense-pictures, and are in fact combinations of memory-images stirred to

independent life. If the dreamer wakes, the dream vanishes, but so long as it lasts it is as actual as any other kind of sensation.

The immortality of the soul is never doubted by a genuine savage. His habits of warfare are barbarous, but his adhesion to morality is in a certain way scrupulously strict, for his regard for the rights of everything spiritual is very intense. The savage does not doubt the existence of ghosts, because he knows them from his own experience; he sees them in his dreams, he talks to them; he consults them or argues with them; he goes out hunting with them or fights his battles over with his slain enemies.

It is not until the dream ceases to be recognised as a reality that the existence of ghosts can at all be doubted. and then stories originate which explain the reason why the dead do not return, but visit us only in dreams. Such is, for instance, the Orpheus legend of ancient Greece, which exists in a similar form among savages also, instances of which among the North American Indians are told by Mr. Hudson of the Field Columbian Museum.

The story of the Greek as well as the Indian Orpheus has apparently originated from the natural longing to have definite evidence concerning life after death and an explanation why the souls of the dead, though they continue to live, cease to remain in direct communication with the survivors.

The wonder of man's psychical nature is his consciousness and the normal functions of his mind. Man is a sentient being. The impressions which the surrounding world makes upon him are pictured in feelings, in the touch of resistance, in taste and odor, in sound and sight, and in addition, in the wants, yearnings, longings, as well as the efforts of doing and daring. The material world around us appears as a sense-picture, and from it by mental processes generalisations are abstracted which furnish the material for ideas and ideals, the building stones of man's spiritual life.

The reality of the bottom rock of our psychical life is very dear to us, for upon it rests the whole superstructure of our spiritual life; and thus it is natural that man longs for a proof of the existence of spirit. Now, the existence of spirit is a fact, and the spirit of man endures in the survivors after his death according to the

impressions he has made upon their souls. The impressions are recorded and remembered. They accumulate and form the most valuable inheritance of the race, for they are the materials out of which the souls of the growing generation are fashioned. Thus the spirits of the departed remain living presences with the survivors; they continue to influence them in their actions and aspirations and become most potent factors in the budding life of the future. In fact, the present generation inherits the soul-life of the past and bequeathes it, enriched through new experiences, new inventions, new discoveries, new aims, and higher ideals, to the generations to come. The souls of the fathers enter into the fabric of the souls of the children, not only by the law of bodily heredity, but also by impressing them with their modes of thought and examples of noble deeds. Thus there is a deep truth in the savage's belief in ghosts, and even if there are no ghosts in the savage's crude conception of them, there is spirit, and the law of the spiritual life of mankind allows spiritual influences to persist. Spirit dies not with the body, and the preservation of spirit makes evolution possible.

The savage, however, does not merely believe in the reality of spirit; he believes in ghosts, for he is as yet unable to discriminate between the two.

By *spirit* we understand the activity of this sense-woven world of man's immediate experience without reference to bodily conditions or a material substratum, but by *ghost* we understand the dream-figure of any being assumed to be an objective reality without the mind of the dreamer. Spirit, accordingly, is an unequivocal reality, but the existence of ghosts, aside from their being actual presences in the dreaming mind, is an assumption. It is not a fact of experience, but an hypothesis which needs corroboration.

Ghosts are at a discount at present because the belief in ghosts has been shaken considerably, but that is no reason why we should not use the word in its exact meaning. Belief in ghosts is now commonly called spiritism, and ghosts are spoken of as spirits, which is a less offensive name.

We insist that the spirituality of the world remains the same

whether or not ghosts exist. Spirit is and remains the most significant reality, and the realm of spirit, so far as science and philosophy have insight into it, may boldly be said to grow naturally from the world of material reality, which somehow contains in it the potentiality of psychic life and is dominated all through by those external norms of life formation which can be formulated as laws of nature. Should we be able to prove the existence of ghosts, it would not add to the worth of our spiritual treasures, which remain what they are, the quintessence of our existence.

There is a type of people who believe in the beauty, the salutariness, and perhaps even the truth, of the mysterious, the miraculous, the inexplicable. I will characterise them in their own words. An acquaintance of mine, an author of standing, and a man whom in practical life no one would perhaps deny common sense, writes: "Blessed is the visionary man in these days. He is the only sane man. The selfish materialist is a lunatic."

Plenty of similar instances can be found in literature, down to the present day. One instance will suffice: The Countess Potocka refers to the story of an astrologer's having greeted Poniatowski's infant child (later the unfortunate King of Poland, Stanislaus Augustus) as King of Poland. Stanislaus Augustus himself never mentioned the story, but, as the Countess says, "all his contemporaries remembered it, and told it *each after his own fashion.*" She adds:

"How enviable is the superiority of character which allows us, without fear of ridicule, to admit freely that there are things one cannot explain, especially as it is impossible to deny them!

"Oh, for the good old days, when people believed in everything!

"First, they believed in Providence, and that simplifies many things.

"Faith was placed in miracles, disinterested love was believed in, devotion in friendship, and even gratitude. . . .

"They believed in philters, spells, presentiments, fortune-tellers, astrologers, ghosts! Those beliefs produced poets, visionaries, religious fanatics, heroes, and madmen!

"Now, the strongly equipped brains, the profound and positive minds, with which the age abounds, refuse to believe in anything, or believe in nothing but bulls and bears!"

It is characteristic of believers in occultism that they exaggerate the contrast between the visionary and the materialist, as if there were no middle ground; and science, which is farthest of all from denying the actuality of life, soul, spirit, etc., is generally characterised as the crudest kind of materialism.

People of this type who are endowed with a "will to believe" in miracles must obviously be unreliable as witnesses, and we know that most of the ghost stories and other occult phenomena are told by exactly such people.

Prophecy, in the sense of foretelling events, is not only possible, but actual; and it is done by the methods of a scientific determination of causes. Thus eclipses are foretold with an incredible precision and unfailing certainty and within the sphere of social, mercantile, financial, and political life we can roughly point out important changes that are preparing themselves in our immediate environs. The prophets of the Old Testament were not soothsayers but preachers; they were not diviners who foretold coming events, for in fact wherever they attempted to do so they failed utterly;[1] they were voices crying in the wilderness, warning the people of coming dangers, "storm-petrels of the world's history" (Cornill, *Prophets of Israel*, p. 35).

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[1] Many random prophecies are uttered annually, and even daily, but very few of them are expressions of a truly prophetic heart. When a youth I wrote down in my diary a poetic vision as to the future of Germany, speaking of the terrors of war, the sacrifice of many lives, and the triumph of victory, culminating in the unification of the fatherland and the restoration of the imperial power. Everything was fulfilled literally in 1870–1871!

Prophecies may be genuine and yet need not be fulfilled. They may be presentiments of an actual and imminent danger, which, however, when recognised, is averted in time. The book of Jonah is a poetical illustration of this kind of prophecy, genuine yet not fulfilled.

I do not hesitate to classify Rudyard Kipling's *Islanders* among the prophetic literature of modern times. It comes from a troubled and anxious heart and wells up not with hate but with indignation. We must bear in mind that the man who speaks of the "witless learning," "the boasting," "the pride by insolence chastened, insolence purged by sloth" of "the arid, aloof, incurious, unthinking, unthanking, gelt," etc., is not a Fenian, not a Boer, not a Frenchman, but an English Imperialist, the author of *The Seven Seas*, and a zealous supporter of the idea of Greater Britain. Whether right or wrong, he is honest, and it is fear for the welfare of his country that makes him speak. Will he remain a voice crying in the wilderness or will he become the Jonah of England?

The ability in man of fore-determining the course of events is remarkable, indeed, but as we understand how it becomes possible by tracing causes to their effects, we fail to wonder at it, yet are struck with awe when confronted with fortune-telling in the distorted forms of abnormal cases, such as are furnished by romancers, gypsies, mediums, soothsayers, dreamers, or somnambulists. It is another instance of the truth that those who are incapable of understanding the significance of spirit are given to a belief in ghosts. Unable to appreciate the normal soul-life, they are puzzled by the marvel of its wonderful possibilities as they present themselves in abnormal phenomena.

The problem of spirit *versus* ghosts is of great practical importance. If occult phenomena are true, if by means of divination, crystal-seeing, second sight, clairvoyance, etc., truth could be discovered, it would be a gross neglect of duty if these methods were not introduced in court proceedings, in warfare, in the verification of historical statements, or for the support of documentary evidence, for attesting wills, for solving the mystery of crimes committed in secret, curing diseases by exorcism, etc., etc. But no sensible man will think of applying occultism to practical and public life, and the reason is obvious: experience is opposed to it, and to employ such methods will generally be deemed a waste of time, energy, and money.

The objection has been raised that we have neglected to develop the occult qualities of man, that we do not yet fully understand their importance and are therefore not able to make effectual use of them.

In answer to this, we must point out that occultism, magic, exorcism, etc., played an important part in the public life of ancient Egypt, Assyria,[1] China, and other countries, but that man-

[1] At a certain stage of civilisation the will of the deity is ascertained through prayer, sacrifice, and by sundry modes of foretelling the future. The Greeks had their diviners who inspected the intestines of the slaughtered sacrifices, the Romans their *haruspices* who watched the flight of birds. The Hebrews consulted Yahveh through the Urim and Thumim, etc. An interesting insight into the significance of ascertaining the will of the deity and foretelling the future in the politics of Assyria is afforded by a perusal of the Assyrian Prayers to the Sun-god,

kind has gradually abandoned them as unprofitable. Phenomena of demoniacal[1] possession disappear as medical science advances. Apparitions and other occult phenomena grow less important with the spread of education; and miracles decrease in the measure that man learns to control the powers of nature by a scientific comprehension of facts. In the days of savage life, spells, prophecies, incantations, are not only believed in, but considered an important element in determining the most important actions, political, religious, and private. Accordingly, mankind did try occultism and found it wanting. Nevertheless, the question is of paramount importance and ought not to be laid aside simply because the *Zeitgeist* is opposed to occultism.

Under these circumstances, we must recognise the value of the efforts of the Society for Psychical Research. They have with praiseworthy zeal collected and collated a vast amount of material in their several publications, among which the *Phantasms of the Living* form a stupendous work. It is supplemented by the proceedings of the S. P. R., published monthly in stately volumes.[2] While

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made on official occasions and recorded in cuneiform documents. (See *Assyrische Gebete an den Sonnengott*, by Dr. F. A. Knudtzon, Leipsic, Pfeifer, 1893.)

[1] An interesting book has appeared of late, entitled *Demon Possesssion and Allied Themes*, by John L. Nevius, D. D., a missionary to China. Edited by Henry W. Rankin. Second edition. F. H. Revell Co. 1896. Pp., 520. The author enumerates a number of cases of possession which are very similar in their character throughout all countries; and the reviewer of the book says: "Spiritism is a growth indigenous to many countries, a plausible interpretation of phenomena which occur spontaneously among all races and not merely a mass of imposture based upon the 'Rochester knockings' and peculiar to the last half of the nineteenth century." No doubt, spiritism is characteristic of a certain phase in the development of mankind, and so is belief in demoniacal possession; but the reviewer strains his point when he sees in such a consensus an argument for the reality of his spiritualistic theory.

[2] Among the communications from the dead, the *Letters from Julia, or, Light from the Borderland*, edited by W. T. Stead (London: Grant Richards, 1897, pp. 188) is perhaps the most typical and characteristic. F. W. H. Myers, one of the most prominent members of the S. P. R., whose honesty and zeal can be as little suspected as those of Mr. W. T. Stead, makes the following comment on literature of this class: "The contents of almost all these automatic utterances—through Stainton, Moses, Mrs. Piper, etc., and also of almost all the best romances on such subjects—Mrs. Oliphant's stories, Balzac's Séraphita, etc.,—appear to me to be more or less—not necessarily directly *derived* from Swedenborg, but—*anal-*

we gladly acknowledge the zeal, the diligence, the honesty, the seriousness, the systematic mode of procedure, and the unquestionable devotion to the cause, in the leaders of the S. P. R., we cannot help expressing wonder at the lack of success which they have met. They frequently complain that their work is slighted by the scientific world. Further, they are sensitive to criticism; they sometimes resent, not without bitterness, any suggestion that the wonderful phenomena enumerated by them would be most easily explained on the theory of fraud, or by self-illusion; they demand that critics should investigate their evidence, and either accept or overthrow it, but they must not doubt the statements of fact.

We can understand how this kind of zealous investigators of the soul feel disappointed at not having made a deeper impression upon their contemporaries. They have sacrificed much labor, and much money; they have shown great enthusiasm for a cause which is very near to their heart; and it is but natural that they look down upon any neglect to accept their statements as signs of the times indicative of a lack of spirituality and of an interest in the highest problems of mankind. The case, however, is, in our opinion, slightly different from the view they take. We take for granted that all the reports are made by people that are not only honest, but also critical and reliable, nevertheless, they are not infallible. If they were, we would be obliged to accept their statements without further question.

The world is not obliged to contradict and refute the man who honestly believes in the reality of certain incredible facts. Unless facts force themselves upon man's experience, he is perfectly justified in leaving them alone; and thus the neglect about which the members of the S. P. R. so frequently complain is simply due to the truth, that these occult phenomena do not play the significant part which they ought to play on the supposition that they are true and reliable.

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ogous to Swedenborg. It is, of course, possible that Swedenborg's utterances convey much of inspired truth, and that spirit-communicators and romancers alike give much the same messages simply because the spirits *know* them to be true, and the romancers *guess* them to be true."

We have touched upon the question of the nature of ghosts, as well as the rise and cause of the belief; we have further discovered the truth that lies in the actual facts from which the belief originates; we have seen how man naturally believed in ghosts and understand that he will continue to cling to this belief even when he has learned to discriminate between waking conditions and dreams. The doctrine of the divinity of dreams is given up only with great reluctance, but the belief in ghosts will be even more tenacious because those who have not yet grasped the significance of the reality of spirit, still remain in need of a belief in ghosts; otherwise they would find no purpose in life, and they must break down under the burden of a meaningless existence. Unless a savage rises to the higher state of a comprehension of the spiritual, it will be better for him to retain his ghost-religion and belief in a ghost immortality; otherwise he would soon lose those gentle features for which the primitive races, in spite of their rudeness and occasional cruelty, are noted and sink to the level of the brute. Accordingly, when we here speak of the belief in ghosts as an error, we wish to point out that there is a truth in it which it is desirable to preserve in the conception of a higher and better and more correct standpoint. On the other hand, however, the recognition of a truth in an error does not justify our abiding by it. The truer view must after all be the better view.

The belief in ghosts, in the ghost-nature of the soul, and in ghost immortality, has a firm hold upon mankind. It is still dear to man because he has grown accustomed to it; it is deeply connected with most important ideals, moral as well as religious; it inspires him with awe, appeals to his imagination, and comforts him in the tribulations of life,—no wonder that it is still a powerful factor even in the life of to-day, and that attempts at proving the existence of ghosts are being made again and again with more or less applause of great masses of mankind, but practically without any success.

If ghosts existed, their actuality ought to be as palpable and undubitable to us as it is to the savage; the manifestation of their existence ought to be so common that we might as well deny the

reality of steam-power or other modern inventions. The fact is that there are always innumerable evidences to those who believe, but the evidences are of a purely personal, or rather individual, nature, which cease to be convincing to outsiders. They are told and repeated, and listened to with awe; they impress many people, but are incapable of finding general credence.

And why? Because they are not like genuine scientific discoveries which are based upon facts that can be corroborated by experiment. No one doubts the reality of the Röntgen rays in spite of their strange nature and inexplicable behavior, because Röntgen describes his experiments in such a way that every electrician can now verify them and test the truth of his statements. The evidences of spiritism have never as yet reached the exactness of scientific demonstrations, in spite of the most respectable attempts made by the Society for Psychical Research and other associations, as well as private scholars who have worked in kindred directions.

The method of all these psychologists who pursue their studies with the purpose of "discovering the soul" is, as a rule, twisted by seeking marvels in the abnormal, and the marvel in the abnormal is practically the same as in the normal. Double consciousness is a strange phenomenon, but the marvel of it is that there is consciousness; that consciousness can be split up into two alternating states is only a corollary to the marvel of consciousness as a manifold unity. Under certain diseased conditions the normal unity can be weakened and another secondary unity is formed. There is no special mystery in the existence of subliminal soul-life, which is exactly as mysterious as the states of our every-day consciousness with its various degrees of intensity. We wink unconsciously, and yet the act is not entirely bare of feeling; it is a feeling that has not passed over the threshold of clear thought, and is therefore called subliminal, i. e., below the threshold.

Studies of abnormal psychology have so far only verified the important truth of our spiritual nature, to which, it may be granted, we have grown obtuse by habitude.

The proofs of the existence of ghosts (or, as the phrase runs

now, "intelligences") consist in stories of marvellous occurrences which if true are apt to suggest the idea of the interference of mysterious agencies; and if the facts are either established or believed or assumed to be true the theory of the traditional belief in spiritual presences of some kind suggests itself as the simplest interpretation. We have dream visions of truth-dreaming; we have hallucinations boding danger, which prove to be good prophets; we have second sight so called, visions of events that happen at a distance and prove to be true; all these stories (even if they sometimes are verifiable on good authority) do not prove the existence of ghosts but the spirituality of the dream. Yet there is lingering with us the notion that a spirit is the dream-body, and even the faintest veracity of a dream will go far toward proving the reality of the dream-body, the ghost.

Now, I do not mean to deny the possibility, nay, the actuality, of spiritual influences, of warnings given in the subliminal soul-life, of prophecies of future events, of flash-light inspirations which come to the poet, the artist, the genius, the leader of mankind to higher planes of life. The man who is full of his subject may find in the hush of night when all his worries and cares have quieted down in sleep, the solution of a problem that he cannot find in broad daylight, during the bustle of the humdrum activity of the world, and then it flashes upon him like a revelation in a dream. The conditions of the solution are all present in his mind; he knows what he longs for, but he lacks clearness; now it comes to him, and he sees it either in direct realisation or in the shape of an allegory.

The prophet's visions are not artificial products of a poetic genius, but the natural conditions of a tortured soul. They may be true, noble, inspiring, elevating, or trite, coarse, and mediocre. Every insane asylum will furnish instances of the latter, while the former have been placed as lighted candles upon the candlesticks of the bibles of the world.

In addition to the subjects that concern mankind as a whole, there are occurrences that are of importance to individuals in every-day life. There are two brothers who love each other; one

is thoughtful, the other careless. There is a bond of sympathy between them, and in a moment when the one in a kind of waking dream-vision becomes aware of the possible results to which a certain rashness in his brother's character must lead him, he actually sees him dying, or suffering, or calling for help. Yet the warning may be too late; it may come almost simultaneously with the accident which may prove fatal to him. If it happens to be true, it will be remembered and recorded; if not, it will be forgotten.

Such occurrences, if they happen, need neither be untrue nor miraculous occurrences, but may be the results of conditions which, if everything were known, would be recognised as natural necessities. The trouble is that the men or women who experience anything of that kind are rarely fully acquainted with themselves. They know themselves only in those factors which rise to the surface of their consciousness and are unacquainted with the unconscious conditions (the subliminal self) from which the conscious conditions emerge with an apparently miraculous suddenness as phantoms out of the realm of nothingness.

Somewhere I read the story of a rancher who had bought a ranch in New Mexico at a bargain and moved to his new property with his wife and children. He had not long been in possession when one night his wife grew restless and insisted on leaving the ranch. She could give no reason, except that she was afraid to stay on the premises any longer. She fell asleep, only to wake with a scream, and thus frightened her husband into leaving the ranch, and—so runs the story—the next night the Indians came, ransacked the ranch and burned the house. The whole family would have been killed had they not moved away in time to save their lives.

Stories of this kind are easily explained. The rancher who sold out, we are told, did so because he had given offence to the Indians and was afraid to remain. His successor gladly bought the property, but he felt instinctively that there was a reason for selling it at such a sacrifice. His wife may have seen the footprints of Indian feet or the feathers of their head-dresses as they prowled about the ranch, but in the bustle of the day she did not attribute

any importance to them; in the hush of night, however, these subliminal experiences come to the front and take a definite shape in dreams. Happy is he who is not obtuse to subliminal impressions. If they are heeded at the right time, they may prove providential.

Man's mind, when in possession of sufficient knowledge, can not only know the future through a due consideration of the determining causes, but can also reach out to inaccessible distances and penetrate into the hidden secrets of invisible processes. Kirchhoff and Bunsen analysed the chemical ingredients of the sun, and astronomers can definitely tell us whether a star is moving toward us or away from us. Further, a keen insight into the nature of our fellows teaches us to read the inmost thoughts of our friends as well as our enemies and to judge them aright, even though they may conceal their intentions from us. Every sense-perception is a telepathic function, for the tree which is seen may stand far away, and yet in spite of its distance, its existence, the place where it is situated, and many other details are known at a glance. Yet mind is more wonderful still: it renders possible a comprehension of the things sensed and thus allows the thinking person both to adapt his conduct to conditions and the conditions to his wants.

Such are the obvious facts of daily life. Our sensations are surprising, our mentality is wonderful, our normal soul-life is a miracle. Yet the miracle is nothing unnatural, or supernatural, or inexplicable. It is in accord with all other facts of life. It is no more wonderful than that the image of a tree on the shore of a lake is reflected in the mirror of the smooth water. The miracle is produced according to the laws of nature, and the wonder in the domain of spirit is that such simple causes can produce such grand effects.

We cannot enter here into the psychological problem as to the nature and the origin of the mind, which we have treated elsewhere: we only repeat that telepathy (but in the literal sense of the word) is a typical feature of the soul. The mind reaches out to the distant and penetrates into the most secret recesses of being; yet it is all according to cause and effect and there is no telepathy without taking note of and properly interpreting the signs that con-

vey the desired information. Telegraphy may be wireless but not without any medium of transmission. In the latter sense telepathy is impossible because unthinkable.

Those who hanker after the miraculous are easily duped by phenomena that are abnormal. They then see the miraculous in the distorted shape of the abnormal and think that the nature of the soul is as abnormal as they see it in their distorted vision. Goethe tells us in a humerous poem how the mind indeed can reach out to distant places, but how natural and simple is his explanation of telepathy![1]

Telepathy is a fact of life: yet there is no telepathy except it be a reading and comprehending of traces which give a clue to the events that produced them.

Man's consciousness is due to concentration of his sentiency upon a purpose, a plan of action, an aim. The end to be attained is kept clearly in view and the means to the end are only noted if they need special attention. Habitual motions are automatically performed; and thus it happens that we unconsciously walk, run, jump, and balance ourselves when standing. Habitual motions have sunk below the threshold of consciousness, they are subliminal.

Not only actions, but sense-impressions also, can be subliminal, and many of them are. When we look at the clock, the whole dial is impressed upon our retina, but we concentrate our attention upon the hour of the day indicated by its hands. We do not mind its sundry details and would be unable to state whether or not, for instance, the figures on the dial were Roman or Arabic. Few people are able to draw a correct picture of their own watch unless they take it out and note the several points.

While subliminal sense-impressions can, under ordinary circumstances, not easily become conscious, they have been made upon the retina and have been registered in the subconscious treasury of our mind. They will occasionally reappear with unfailing exactness and correctness in a dream and may become the deter-

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[1] See Goethe's poem *Wirkung in die Ferne.*

mining factors in such warnings of which the story of the New Mexican rancher is an instance.

Abnormal conditions are impressive while normal soul-life is too common to find due consideration.

We know how injurious the belief in trance revelations sometimes is. The confidence of the pious in divine assistance frequently leads them to perdition. Witness the sorry defeat of the Indians at Bended Knee when they relied on the promise of their medicine-men that they should be invulnerable. But again there are instances in which apparent miracles are worked, and the implicit belief in the divinity of prophetic utterances or commands is an portant factor in their realisation.

We cannot doubt that if a man withdraws from the bustle of his daily occupations and hushes the restless clamor of his wants and worries, the still small voices of his subliminal soul-life, which cannot gain a due consideration under ordinary conditions, will make themselves heard and the result will upon the whole be salutary. The late Mr. Cushing who lived among the Zuni as a Zuni and was admitted to one of their secret societies, working his way up to the highest degree, translated at my request the *U˘pu-na kya Hai˘tosh-nan-e* or "Commandment of Retiring," which in a solemn address the father gives to his son. As it characterises the seriousness of truly religious devotion of their trance exercises and has not as yet been published, we quote Mr. Cushing's communication which reads as follows:

"My Child,—
Be thou stilled and keep silence
Throughout all days appointed,—
That the silent Supreme Ones,—
Who speak only in silence
As men think when speechless,—
May be heard in thy stillness
And felt in thy thinking," etc

"My Child,—

"Thou shalt fast enduringly, and labor in sacred spirit undividedly as do the silent surpassing Ones, keeping vigil unwearyingly as do the stars, that thou stay thy heart from all longing save to gain their knowledge on their ways and see as

they and the stars see, thinking not of sleep, nor of food and garments, neither of men and their speakings nor of women and their pleasures, nay, nor even of thy younger sister, taking no thought of what thou wilt do withal or say or want another day, nay, not even of thy corn, whether it be growing! For, thus only mayest thou, if so be, hear the silent surpassing ones and learn their knowledge and their way, and see as they and the stars see, 'many things as men see one thing,'" etc.

While I do not deny, or rather *because* I know that for certain reasons we cannot deny, that there is an underlying reason for apparently marvellous instances of a keen penetration into the hidden concatenation of events, I feel urged to declare that so far no fact of unequivocal reliability has come to my knowledge which will prove that disembodied ghosts walk about as objective realities, nor that they enter into communion with those that live in the flesh. The spirit of a great man survives in his deeds, his words, his ideas, and they are recorded in our memory to remain with us as spirit of our spirit.[1]

Though my conception of spirit would make ghosts as objective realities impossible, I have not neglected to study the evidences that speak in favor of their existence, and the result has so far been negative, while I can detect flaws in most of the ghost stories which I have on the authority even of unequivocally honest and acute observers.

More than a century ago Kant investigated the problem of ghosts, and he came to the conclusion which he published in 1766 in his *Dreams of a Visionary Illustrated by the Dreams of Metaphysics.*[2] Kant's treatise is disappointing inasmuch as he gives no details of his investigation, but states the *résumé* only, not without a grim humor and, as he confesses, "with a certain humiliation that he

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[1] In the Gospel according to St. John "spirit" is defined by Jesus (vii. 63) as "the words that I speak unto you;" and later on (viii. 25) in reply to the question "who are you?" he answers *τὴν ἀρχὴν ὅτι καὶ λαλῶ ὑμῖν*, i. e., "First [I am] what I speak to you." The translation of King James's version obliterates the meaning by adding "the same."

[2] The book has been translated by Emanuel F. Goerwitz with an introduction and notes by Frank Sewall, the well-known Swedenborgian writer (London: Swan Sonnenschein & Co; New York: The Macmillan Co., 1900), under the title *Dreams of a Spirit-Seer.*

has been naïve enough to trace the truth of some of the stories of the kind mentioned. He found—as usual where it is not our business to search—he found nothing."

Swedenborg's revelations are by far superior to anything more modern that goes under the name of spiritual manifestations or mediumistic materialisations, because Swedenborg is backed by religious fervor, a poetic imagination, and a certain philosophical grasp, while the productions of the average medium are commonplace and trivial, so as to provoke the criticism of the unbeliever who says that if the spirits of the deceased can offer nothing better it is a sure sign that they have undergone in the beyond a serious degeneration. The most remarkable instance of modern inquiries into the possibility of communication with intelligences beyond the bourne is the case of Mrs. Piper, conducted by no less an authority than J. H. Hyslop, Ph. D., Professor of Logic and Ethics in Columbia University, New York. The case is remarkable, not on account of the results, but because a man of Professor Hyslop's position and name feels satisfied as to the genuineness of the communications with his relatives that have passed to the spirit-land. He says:

"I have been driven to the favorable consideration of the spiritistic hypothesis and instead of evading it as long as possible throughout my report and resorting in a pedantic way to circumlocutions for the purpose of preserving the impression of cautiousness which I tried to maintain in forming my convictions, I have decided to treat the sittings in general from the point of view which I finally reached.

"Instead, therefore, of seeking to point out what incidents might be explained on the hypothesis of fishing, what on the hypothesis of guessing, what on the hypothesis of telepathy, etc., I have tried to take the reader behind the scenes, as it were, and to show what relations the different incidents may suggest with the habits and experiences of the supposed real communicators.

"I offer, therefore, my analysis, not as proof, but as legitimate interpretation of the record and the results of psychical research generally. I am willing even to be generous to critics, and to admit, for the sake of argument, that the spiritistic theory cannot be proved in the sense that some appear to demand of a demonstration."

Even in this cautious form Professor Hyslop's statement seems to us sanguine. When we contemplate the delicacy of the human mind and man's ability to read instinctively the insignificant signs

of important events, we can no longer be astonished at the remarkable phenomena of abnormal conditions, for they only repeat in a distorted and rather disorderly manner what happens daily under normal conditions.

Professor Hyslop is perhaps more critical than any other observer of the Society for Psychical Research. He is an enthusiast who believes he has bridged the gap between the two worlds, and yet how meager are the results! Whatever results there are, their value is set off by the fact that Mrs. Piper's subconscious self needed a whole *séance* for reconnoitering the field of her experiments. We say *her* experiments, for while the professor thought *he* was the experimenter, he might have considered the possibility, and I suppose he did, that he in turn was the subject of the experiments of Mrs. Piper's trance personalities.

Professor Hyslop says of his *Observations*:

"In summarising the facts in the record, I shall group them, as far as this is possible, according to their subjects, treating together those that occur in different sittings but pertain to the same incident. In this manner we shall better be able to comprehend the collective force of the evidence as it is represented in complex wholes."

In grouping the facts according to their subjects, Professor Hyslop adds to them part of his own mind, and thus he no longer gives the facts pure and simple, but as digested by his comprehension of them. Happily he is a logician, and though he apparently felt inclined to omit the first *séance* as irrelevant in results, he publishes the minutes of it. He says:

"The first sitting, however, I shall treat rather by itself, as it is evidentially unimportant, and such value as it obtains comes chiefly from the light that later incidents throw upon it."

Professor Hyslop characterises the first *séance* as preliminary to the others. Believing in spirits and regarding the medium as a kind of telephone through which the deceased find an opportunity to speak, he finds the first sitting intelligible as a "dramatic play in the trying conditions for selecting the proper communicators...." It is an "apparent groping about of inexperienced communicators to make their presence known."

We quote Professor Hyslop's statement in full, for it throws light upon all the sittings which he had with Mrs. Piper:

"The chief interest of the first sitting, then, from the point of view above indicated, is the dramatic feature representing the process of ascertaining either my identity or the proper communicator. After the usual preliminaries at the beginning of the trance, such as greetings, arrangements for future sittings, etc., the function of amanuensis was turned over to G. P. in this instance, and Dr. Hodgson was sent out of the room just as a lady claimed to be present to communicate with me. Several pages of writing follow, in connection with this attempt to "reach" me, that are full of confusion so far as evidential matter is concerned, though intelligible as dramatic play in the trying conditions for selecting the proper communicators. In the midst of this confusion the names Margaret, Lillie, and Henry [?] were given, evidently by the lady who claimed to 'belong' to me as my mother (cf. p. 306).[1] Careful investigation shows that there is no Henry, near or remote, among the direct family connections. There is an interesting piece of contingency in the first two names, as I had a sister by the name of Margaret, the oldest in the family, who died when I was two years old, and another, my twin sister, by the name of Sarah Luella (cf. p. 331), at which Lillie might be an attempt. But I cannot be sure of any relevance in either of them, and the contingency deserves to be mentioned only as one of those things that so easily mislead the ordinary inquirer into the recesses of this subject. Whatever the theory to account for these phenomena, it is evident that these names belong to the connections of the lady claiming to be related to me. Assuming from the spiritistic point of view that a number of persons were trying to 'reach' me by shouting all at once into the telephone, so to speak, we might interpret these names as significant, excepting the name 'Henry.'

"The communications that follow show confusion, though capable of being disentangled by legitimate interpretation. The name 'Alice' comes closely upon 'Henry,' but is immediately corrected to 'Annie,' which is the diminutive name of a deceased sister, though this relationship is not here asserted by the communicator. In fact, it is not possible to assume with any assurance who the communicator might be, though it is probably the person who claims to be my mother. On this assumption she is trying to give the names of the members of the family with her, and the correction of the mistake of 'Alice' for 'Annie' is possibly made by the latter herself. Immediately following this I am asked if I remember anything about my brother. I ask who he is, meaning that I want his name, and the reply is: 'I say, brother. I am your . . . I know I am and . . .' which might be either from this brother or the person claiming to be my mother. I then asked: 'When did you pass out?' and got the answer: 'Only a long time ago.' This would be

[1] The page numbers in parentheses refer to Professor Hyslop's report in the *Proceedings of the S. P. R.*, Vol. XIV., Oct., 1901.

true of both my brother and mother, while the 'only' might be interpreted as a word from the message 'only a short time ago' of someone else, possibly my father. This is apparent from the answer to my next question, which was: 'Any other member of the family?' The reply was: 'Yes, two. I have seen Annie and mother and Charles and Henry.' Whoever the communicator was in the previous equivocal messages, it is apparent, on the surface at least of this last answer, that it was neither my brother nor my mother. Hence seeing in the sentence thus naming the members of the family that the communicator was not my brother Charles, and, as I knew there was no Henry in the family, I tried the dodge of pretending to believe that it was Charles Henry, and asked if it was. The answer: '*No*, Charles,' was very pertinent and correct, as it excluded the Henry from consideration. Thinking that I was not dealing with my brother, but with my father, I asked the question: 'Did he [Charles] pass out before you?' and the answer: '*No*, I did not hear, did you say before,' was followed by, 'Yes, *he did*, some time before.' The latter was correct, assuming that it was my father. The allusions that follow to the trouble with the head and heart would apply, as far as they go, to my father, and the passage comes to an end with the odd statement: 'I say, give me my hat.' I learned later that this expression was characteristic of my father (cf. p. 313). I here presented an accordion for the hand to touch (for reasons that the reader will find explained in the history of the Piper case. See footnote, p. 307), but it did not prevent the confusion, so that the communicator was supplanted by my brother Charles apparently, though there is no positive assurance of this until the communication is stated in the first person of the one claiming to be my brother. But he in turn is almost immediately supplanted by a lady. The statements about the ownership of the accordion depend for their relevancy altogether upon the question who is communicating, and this is not made clear. Apparently it was my father who had referred just before to his suddenly passing out at last, to the trouble with his head and heart, and said, 'I say, give me my hat,' and hence assuming that it was he that said, referring to the accordion,—'this was not mine but his. It belonged to George' (cf. guitar incident, p. 461),—we have two statements that are false, though it is interesting to see that they are apparently corrected immediately and spontaneously. But if my brother Charles said it, as he was evidently communicating in the next sentence, the first statement would be true, supposing that the pronoun 'his' referred to the previous communicator assumed to be my father. My brother's next and very definite statement, supposing that the original is rightly read as 'my father,' was exactly true in all its details, namely, the ownership of the accordion, the implied death of the owner, and the name of my brother. My statement that 'it belonged to someone else' is not suggestive of the facts, though it might appear suspiciously near it. The strongest fact in the passage is the statement or implication that Charles is the name of my brother. Annie, or Anna, was the name of my sister, but I am not distinctly told this, while I am left altogether to the contents of later sittings to infer the

possibility that the allusion to the trouble with the head and heart, and to the want of a hat comes from my father. No independent evidential value belongs to the passage. There is simply in it the apparent groping about of inexperienced communicators to make their presence known."

Mrs. Piper herself disclaims any belief in spiritism and suggests telepathy as an explanation of the manifestations of her trance conditions, but we do not think that there is any need for resorting to any extraordinary hypothesis to explain the coincidences which to Professor Hyslop are a convincing evidence of genuineness—in spite of the many errors, haphazard guesses, and confusions of the several impersonifications.

Says Professor Hyslop:

"The second sitting opened with a very marked difference between it and the first. The situation seemed to have completely changed. The same apparent causes for confusion were not manifest. The trance personalities seemed to have the situation perfectly at command. The first sitting had closed with the expressed indication by G. P. that the lady who had claimed me for her son should be made clear again. But in the meantime it was as if the trance personalities had consulted over the situation and the evidence, and had become assured of the right communicators. The opening of the second sitting after the usual preliminaries with the confident address to me in my own name in the very first words is evident of the appearance as I have described it. I was addressed: 'James, James. Speak. James. James, speak to me. James. James,' the name by which my father always called me after 1877. But there was no such apparent fishing and hesitation in regard to the rightful communications that had marked the dubious situation in the first sitting. The way was now perfectly clear for settled communications."

While Professor Hyslop encountered difficulties in identifying the several spirits who changed off without any apparent reason so that he had to distinguish the speakers by the substance of their communications, the spirits in their turn had also to adapt themselves to the novel situation and to learn how to express themselves properly. Quoting from the records Professor Hyslop says:

"Will you let me return again and help to free my mind? Do you know Uncle Charles? (S.: What Uncle Charles?) He is here. (S.: I don't know any Uncle Charles.) And * * No, I am thinking . . . let me see. I think it is not a real uncle. You must remember what I mean. He used to be so nervous.

"It all at once dawned on me that 'Uncle Charles' was a mistake for 'Uncle

Carruthers,' who had died about a month previously. He was the husband of my father's sister. The relevance of the passage is therefore evident. Almost immediately my father says, evidently with reference to this sister and another, both of whom had just lost their husbands within a month of each other: 'I wish you would tell the girls I am with them in sorrow or pleas . . . or joy, it matters not. What is their loss is our gain.' The name (Eliza) of one of these 'girls,' his sister and the wife of the communicator to whom he had just referred, was given in my uncle's communication. The sentence, 'what is their loss is our gain,' was both pertinent and a common expression of father's in situations of this kind. The record then proceeds as follows:

"'(S.: Free your mind, father.) I will, indeed, but have you seen the children yet? (S.: I have not seen them for two years.) They are wonderfully good, I think. I know, James, that my thoughts are muddled, but if you can only hear what I am saying, you will not mind it. Do you know where George is? (S.: Yes, I know where he is.) Are you troubled about him . . . he is all right and will be, James. (S.: Yes, all right.) *Worry not.* (S.: No, I will not worry.) But you do. (S.: Yes. I have worried some, but I will not any more.) Thank God. James, if you will only stick to this . . . stick to this promise not to worry, you will in time be contented and happy while still in the body (cf. p. 316).'

"This is a very pertinent passage. How much so is brought out more fully in my notes (cf. pp. 317, 342). But the name of my brother is correct, and the advice not to worry about him was characteristic of my father in the matters connected with this brother. The mental attitude of apology toward him is that of my father toward him while living. The expression 'stick to this' was also characteristic."

Professor Hyslop declares (and I believe he is perfectly justified in his conviction) that the possibility of fraud is excluded; yet he is a little too positive about it when saying that, having stated the situation, he would absolutely refuse to discuss the theory of fraud.[1] When he thinks that it is the critics' duty to prove dishonesty, we differ from him. If critics doubt, they cannot be helped and will have to forego the benefit of being convinced.

Says Professor Hyslop:

"Nor is it necessary to resent any insinuations that we are duped, until those who are possessed of so much intelligence without any previous study of this special instance can produce specific evidence that the subject of our investigation exhibits the qualities and engages in the kind of work that must be supposed in order to meet the case. It is easy to say 'fraud' and suggest any number of imaginable

[1] *Proceedings*, p. 9.

methods of deception, as it is known and practised in most that passes for spiritualism. But it is quite a different thing to indicate the exact kind of 'fraud' necessary to reduce the character of a given case."

Professor Hyslop's case is remarkable on this very account that there is no reason to impute fraud to him, and because he more than any other investigator was aware of the fallacies of self-deception. Yet in spite of the precautions taken by him, his experiments fail to convince. Positive proof is wanting. The best he can claim is his hope that his experiments are a rambling beginning only, which will finally lead to the establishment of regular lines of communication with the dead.

Mediumistic revelations, it is true, are sometimes surprising, but they are not more so than blotted inkspots which might as well have been used for fortune-telling as the flight of birds, the laying of cards, the pouring of molten lead into water, the observation of figures in dying embers, etc. It is well known how frequently blotted inkspots exhibit definite forms, butterflies, faces, demons, dragons, animals of all kinds or mysterious symbols, and any one endowed with a lively imagination will readily be able to interpret their meaning.

As blotches will acquire a plain and unmistakable meaning to those who seek in them a hidden sense, so the random talk of erratic minds will be full of deep significance to those who are blind believers in occultism. The haphazard of coincidences is so grotesque that wherever a belief in miracles prevails, miracles will actually happen. Says Faust:

"Das Wunder ist des Glaubens liebstes Kind,"

and Mephistopheles, when bewitching the drunken students, exclaims:

"Hier ist ein Wunder, glaubet nur!"

While I do not hesitate to say that ghosts are not objective existences, I am not prepared to add (as indicated in the introduction to our article) that ghosts are unreal. If by ghosts we understand apparitions, there can be no doubt that ghosts are as real as our sensations. Our sensations in dreams are as real as the sense-

impressions of our waking state, and apparitions are dreams in a waking state. Here again (as in all other psychological problems) the miracle of sensing is exactly the same for the normal as for the abnormal conditions. How wonderful that a sense-impression, caused by contact with the surrounding world, is transformed into perversion; the ether waves change into visions, viz., pictures in the eye conceived as forms outside, radiant with the warm glow of color and moving about with life; air-waves become sounds, high or low, noisy or clear, beautiful and appealing in music and freighted with meaning in language. Tastes and odors are the psychical aspect of chemical processes, and resistance, hardness and softness, cold and warmth, are transformed pressures and stresses of mechanical contact. The reality of sensation as a telepathic mechanism, the actuality of feeling our internal states as surroundings, the immediate awareness of distant objects in corporeal visions and sounds and touches and tastes and odors is the wonder of psychic existence; dreams are merely pale echoes of it, and the abnormal states of hallucination are ugly distortions of the grand phenomenon not less wonderful, but happily of rarer occurrence, and because unusual, therefore attracting more attention.

Sailors used to delight when passing the line in playing jokes on unwary passengers or on the ignorant new hands on deck, one of them consisting in a plan of showing them the line. The old boatswain is busy with the telescope that he has put up on a tripod on the bow; he murmurs, "I can see it plainly; it may be six or seven miles distant." Passengers ask, "What can you see?" and he answers, "The line." And truly, whoever can be induced to look through the glass, will see a big line stretch along the horizon. It is a hair that has artfully been attached to the objective. The line is visible far away about six or seven miles; it is as real as the whole picture of the ocean waves; but like a hallucination, it is no objective reality in the surroundings of the ship where it appears. Its appearance is due to a disorder in the apparatus which serves the function of perception. So angels and devils, deities, seraphim and cherubim, incubi and succubæ, are (whenever they make their appearance in a disturbed soûl) real

enough, but their reality is a psychical state in the mind, not a bodily presence outside. That as psychical states they are real, is no more wonderful than the reality of any normal sense-perception.

As soon as the passengers know the secret of the trick, they no longer see the line stretching across the ocean, but are conscious of the disturbing presence of a magnified hair whose form is superimposed upon the picture of the distant waves. A comprehension of the subjective nature of its cause will gradually give us the mastery over hallucination, but ignorance condemns us to slavery. Apparitions impress us more successfully with the notion that ghosts exist than do the prestidigitateurs; for apparitions have the advantage of being real, while sleight-of-hand consists in tricks by which we are duped.

The professional medium is a performer who utilises the belief in ghosts or the notion of the objectivity of psychical abnormalities to make a living. Undoubtedly it is an interesting profession and its practice demands a keen observation and a quick judgment of character. It differs from sleight-of-hand considerably, in as much as the latter consists in the performance of tricks which in their minutest details have been planned beforehand. The medium must constantly be on the lookout and watch every opportunity to surprise his victims with an unexpected revelation or an inexplicable manifestation of his spiritual power. His art consists in deriving knowledge on the sly without rousing suspicion and utilising it without betraying his source of information. He must prepare his public by instilling into their minds a belief in the possibility of spiritistic phenomena, for if he succeeds in this he will have easy play when the occasion arises to show his powers.

One medium who did his best to surprise me with his spiritual vision, told me that he could see the spirits of great sages hovering about me, and I should say whether he was right. Among them he saw Confucius and Buddha. If he had been better informed he would have named Lao-Tse before Confucius, but I did not mean to be a stickler for trifles, so I freely granted the truth of his observation and asked him to describe to me their appearance, as I had always longed to know what these men looked like. Em-

boldened by his success he described Confucius as a typical Chinaman wearing a long cue (!) and Buddha as a venerable old man in flowing white (!) robes with a long white beard (!). My mediumistic friend did not know that the cue was only forced upon the Chinese by the Tartars, and that Buddha belonged to the order of monks that shaved their heads and wore yellow robes. Buddha does not seem to have observed the rule of shaving his head, and Buddhist artists represent him with hair on his head and bearded, but never with long whiskers or a flowing white beard.

It takes a good education to be a successful medium, unless he seeks his public among the uneducated whom it is easy to dupe.

It is comical to notice that the spirits of well-educated Germans make the mistakes which German-Americans are apt to make and thus a message which is surprising to the uninitiated is comical to those who know German. Here is one actually and literally given which is written in the typical spirit style and contains a grammatical mistake that betrays its origin:

"Du siehst im Fall alles günstig ist kann ich zurück kommen um Dir eine Botschaft zu bringen. Gott liebt Dich und ist immer mit Dich. Ich bin glücklich.

"In Liebe

"Vater."

Of course a medium claims only to tell you what he sees and he only transmits messages such as he receives. If Confucius wore no cue in his lifetime, and if Buddha did not dress in white, and if he shaved his head, they may have changed their style in spirit-land; and an educated German may have mixed with crowds of spirits less careful with their grammar than he was in his life, so that he no longer discriminates between *dir* and *dich*. Who, in theory, can deny the possibility of the argument? Yet no sensible man will accept it. Nevertheless, it appeals to those who are satisfied that whenever an unbeliever grasps a spirit, the spirit will escape as a matter of course but will substitute in his place the medium. The theory presupposes a strong faith in the existence of ghosts, but it is good, and experiments have so far proved it to be true.

A very good method of experimenting with mediums wherever

one is utterly unknown is by tacitly acquiescing to some of the haphazard but erroneous guesses and thus leading them on a wrong track. If we invent the existence of a late sister or brother whom we never had, the medium will frequently describe their personalities such as we conceive them to have been; and if we consider their experience and daily practice in guessing thoughts which are typical with all their patrons, their ability to ferret out secrets by no means calls for extraordinary explanations of thought-reading by telepathy or occultism.

Many years ago, I myself, in company with Dr. K. Richard Koch, now professor of physics at Stuttgart, and several other friends, made experiments along the line of those psychical conditions that lie in the field of mystery. We made use of a spirit-writing machine called a "psychograph," similar in purpose to the planchette, built not unlike a pantograph, having an indicator or pointer turned downward, which runs easily over a sheet of paper bearing the letters of the alphabet. The experimenters take hold of both ends of the instrument, and form a chain by touching their hands; any witnesses may form intermediate links in the circle. When the excitement is sufficiently raised, the indicator begins to move, sometimes slowly, sometimes rapidly, and rests from time to time on the different letters. The lightness of the apparatus makes it possible that either of the experimenters holding one end of the psychograph can slightly guide it. An unconscious guidance is of course more than a mere possibility which in explaining the experiment deserves serious consideration. In spite of innumerable most remarkable answers which we received through the psychograph, we could not establish a satisfactory theory, except that of self-delusion. Our desire for the miraculous unconsciously acted in collusion with our own subliminal soul-activities. Although subjectively both honest and critical, we became dupes of our own wishes, which anticipated our hopes, making us pounce joyfully upon every accidental coincidence, and these coincidences were not only frequent, but sometimes also surprising.

Since the records were destroyed, the report of our *séances* is beyond recovery, nor do I regret it, for the world is not poorer for

it, since they would contribute nothing toward a solution of the problem—except (as stated before) the frequency of surprising coincidences, viz., of instances when an answer hit the truth under circumstances under which the attending persons could have no information on the subject. Such remarkable cases, however, changed off with silly or stupid or unmeaning sentences and also with answers which seemed to be indicted by a lying spirit, for they hit it wrong, as if on purpose, for the sake of leading astray or mocking us.

Years after these experiments the idea struck me that according to the law of probabilities such should exactly be the result of haphazard guesses. If I have a bunch of six keys and try them in one of their six respective key-holes, my chance of hitting the right one is one sixth. But I may hit the right one at once, or perhaps I may try all and find the right one to be the sixth in the series. The extreme cases of good luck and ill luck may not happen more frequently than the others, but they will certainly be better remembered and thus produce the impression of a greater frequency. Did you ever reach the station after train time and find the train late so that you could just step aboard and go? If you did the coincidence at once assumes the appearance of being providential. But sometimes the reverse happens, you arrive at the depot only a second late and just in time to see the train pull out while you are left behind. Does it not give the impression of a malevolent interference of some evil spirit? There are many misprints in books and newspapers, but most of them remain unheeded: those that are imputed to the printer's devil are sure to attract attention.

When still a boy I dreamed once how death, in the shape of a skeleton, entered the house of a schoolmate of mine, and when on the next morning I looked out for him he was missing, and during school hours a message was delivered to the teacher that his father had died during the preceding night. He was by no means one of my nearer friends, nor had I known his father or heard of his illness. How many hundred and thousand dreams have I had which did not turn out to be true; and they are forgotten!

Being interested in the psychological problem, I thought it might be interesting to make experiments in the line of probabilities and the way they are accepted, and I can say that I was successful. I imagined myself in the place of a medium and acted accordingly, only with the advantage that while the professional medium must be ready when called upon, I could bide my opportunity and so I was always sure of success. The victims of my experiments must excuse me for publishing these accounts, but since I may fairly assume that they have all passed into the spirit-land where they have ceased to worry about earthly affairs, I hope to be forgiven.

About eighteen years ago I met an old and highly intellectual lady of distinguished family whom I had in vain tried to convince of the fallacies of the common spiritualistic vagaries. Having mentioned my experiments with the psychograph, I promised to produce the machine and explain it to her. I was determined to make a success of the experiment, and so I assisted the spirits in their attempts at manifestation.

"This machine is interesting," said Mrs. A.; "perhaps it can tell us whether or not spirits are present." I deemed it wise to let her name the spirits first whom she wanted to address. So I guided the indicator to the letters CALL THEM. I had just finished when she threw up her hands with great joy. "I knew it," she exclaimed, "he is always with me." I gazed at her with unconcealed and sincere astonishment. "Who?" I asked.—"Did you not read the reply?"—"Yes, I did," I said, and paused in expectation.—"Oh!" she continued, "you do not know him! He died when only nine years old, and he is always with me!"—I repeated my question, "Who?"—"Allen, my boy, a darling child."

She read only the letters ALL and E, supplying the N from her own imagination, for she expected the name Allen.

My first answer had been a happy hit, and I was not less successful when I continued the game. "I knew," said the old lady, "you were sent by my daughter Mary. You were sent to-day, for it is a special day which she wishes me to remember. Let us ask the psychograph what day is to-day?" Now I saw three possibil-

ities: either it was a birthday, or a marriage-day, or the day of her death; but there was no time left for weighing the probabilities, and I made the machine reply BIRTHDAY. My guess proved to be wrong, but Mrs. A. was more delighted than before. "That is just like my Mary; I ought to have expected that answer. To-day is the anniversary of her death, and she calls it her birthday. But she is right: death is a spiritual birth."

I will mention here another occurrence that happened to me while living in Germany. One afternoon on coming home my landlady told me: "I have visitors, among them a spinster well progressed in years, and yet I happen to know of a love affair she had with a captain R. in my husband's regiment when they were quartered in their home during the maneuvers. He told my husband all about it and (the poor fellow!) died a fortnight afterwards. . . ." I was introduced to the company, and cards lay on the table. I met Miss B., and in the course of the conversation she happened to ask me whether I could tell fortunes. I replied that I did not believe in fortune-telling, but I had tried it and knew several methods of doing it. She now pressed me to try it on her, and I yielded not without ostentatious reluctance. I began: "I see nothing of marriage; but there lies the king of hearts, and there is a little love story." Here I halted as if frightened at a certain card-combination. "Oh, fortune-telling is a farce. Now here is the ace of spades near by; that means a case of death. There can be only a few weeks between. The cards are very definite. I could spell out a name!" Several voices interrupted me: "Oh, do so! it will be interesting to hear Miss B.'s love story," and I said to myself musingly: "But it gives no sense. Here it is: I spelled out the letters CAPTAIN R . . . ."

How the poor old lady's face blushed! I did not betray that I noticed it and endeavored to draw away from her the attention of the other guests.

In comparing notes with others, I heard many stories that are both amusing and instructive.

The late Mr. Alvan Clark, the well-known manufacturer of telescopic lenses, had much experience in this line; he was full of

it and told me how once he had had a very interesting sitting with a common medium who hit on his occupation by describing it with much circumlocution but correctly by saying (I quote from memory merely): "Your father is standing behind you, and you are doing work in the line of—well, not an optician, it is much higher; you are on the top of the ladder, but it is of that kind." Mr. Clark went again and again and spent many a dollar uselessly in order to try whether the same or some other medium would succeed again and have a similar surprise in store for him. However, all was in vain. He had no explanation except that it was a happy hit of the medium, but he remembered a short time before visiting the medium to have stood before an optician's shop and may have dropped a few words concerning some apparatus which could have been overheard by a bystander.

Mr. Alvan Clark had several experiences in the same line as myself. Once going West, he met in the sleeping-car a gentleman who spoke frequently about spiritual phenomena, and Mr. Clark had become curious to know who he was; but his fellow-traveller appeared to be careful not to betray his identity, and so Mr. Clark deemed it improper to ask for his name. Once, however, the stranger betrayed himself when a certain firm in Ohio was mentioned, by saying: "We furnished the iron castings for their works." This was sufficient for Mr. Clark, and he knew it was Mr. S. of C. When the mediums were again referred to, Mr. Clark said that he sometimes felt as if he possessed some strange powers himself, but he succeeded best with strangers whose very names were unknown to him. He knew that Colonel S., a near relative of Mr. S., a one-armed veteran of the war, who loved to drive with spirited horses, had died in an accident. When about to give his fellow-traveller a trial, he began in a dreamy way: "I see a long bridge, and I pass along, I see a factory. I can read the shield over the entrance: S. & Co. There is a gate, and a buggy is driven by a one-armed man, apparently an old soldier." (Then he described Col. S. minutely.) "The horse shows much metle, and the driver has difficulty in holding it. The street-car passes by; the horse shies. The buggy is upset. I fear the one-armed driver is

dangerously hurt; etc., etc." There is no need of finishing the story or giving further details. The event served Mr. S. as an additional proof that the best and most convincing evidences are obtained not from professional mediums but from private persons and sometimes in quarters where one would expect them least.

One more story of an old forester of my native principality, the earldom of Stollberg-Wernigerode. On a beautiful day in fall when the hunting season was just opened he sauntered through the wood and strolling over the frontier into the domain of his Prussian colleague was suddenly confronted with a splendid roebuck. He could not forego the temptation to shoot, and the buck fell. The forester saw him crawl into a thicket near a big oak a few steps from the pillar that marked the frontier. There the buck sank down and died. At that moment he was hailed by a Hallowih from a near distance. Knowing that he was on foreign territory he withdrew as near as possible to his own domain. After a few seconds his Prussian colleague, Forester M., made his appearance and said that he had seen him and followed. Happily he had not witnessed the good luck of the Stollberg forester on illicit hunting grounds, and a few words were sufficient to explain the shooting. He had tried his gun and was now searching for the bullet in a tree at which he had aimed.

The incident was no longer thought of and the two foresters returned each one to his own home. The weather changed and a heavy rain poured down, when a messenger from the old Count Stollberg made his appearance at the forester's residence with the request to furnish a roebuck at the castle in Wernigerode. The old forester rose and said: "How can I go out hunting in this storm? What shall I do. Well! I'll do a thing that I would not do under other circumstances." Therewith he took his gun and with some mysterious gestures shot into the chimney. Then he turned to a lad in his employ and described to him the place where he would find the roebuck. The lad hitched a little wagon and within a few hours the game was delivered at the castle. No wonder that the old forester was looked upon with awe by all his subordinates.

In the face of my own and other people's experiences it seems

advisable that we ought not to allow ourselves to be overawed by one or two or even ten or twenty surprising coincidences. Sometimes an incident seems inexplicable except on the assumption of miracles or a special interference of spirits. We must always bear in mind that "many things happen between heaven and earth which are not dreamed of in our philosophy." These "many things" are mostly items of the simplest and most natural kind, which would give a clue to the explanation of the most extraordinary events.

I abstain from making any conclusion or putting forth a new theory as to the nature of ghosts; I break off abruptly by asking my reader's indulgence for having dished up in lieu of a philosophical essay some amusing stories; but I assure him my intention was not to divert him with anecdotes: I am serious, and there is a moral in these humorous incidents which is worth while minding.

A *résumé* of my views is simply this: I believe in spirit, but not in ghosts.

EDITOR.

A STUDY IN THE LOGIC OF THE EARLY GREEK PHILOSOPHY.

BEING, NOT-BEING, AND BECOMING.

TO understand the early Greek philosophy one needs among some other things candidly to recognise and appreciate the following fact. Those early philosophers from Thales down even to Anaxagoras and the Atomists were almost, if not quite, in complete subjection to the physical or cosmological point of view. The reasons for this subjection, naïve thinkers that they were, are not far to seek and can hardly need attention in this place, but the consequences of it are important. Thus, the human mind being always conservative changes its point of view only under extreme necessity, often preferring even absurdity to surrender, and this conservatism is certainly bound to be stronger among early naïve thinkers than among the mature and more sophisticated. The ancient Greeks, then, of the days before Socrates were for several centuries under the spell of the physical standpoint, and their imagination, made subtle and ingenious by the persisting conservatism and by the necessities that the very progress of thought imposed upon it, led them into strange unearthly places, where even paradoxes, seen and unseen, lost their wonted terrors. And of course in our own times, in these times of natural science, which has shown a disposition at any cost to hold to the physical and mechanical point of view, sympathy with them is easy.[1] By our modern science the paradoxical has been confronted with an amazing bravado, when

[1] I do not forget that the position taken by science to-day is usually taken consciously, being for the most part a matter of method.

not with a most complacent unconsciousness, and for that matter all human thinking, modern or ancient, has shown itself similarly bold or blind. Human thinking, necessarily one-sided because necessarily subject to some particular point of view, in its search for objective truth must sooner or later, consciously or unconsciously, run into the contradictory or paradoxical, which is both-sided or impartial, and the paradox, so developed, is only the labor that precedes the birth, albeit the slow, almost reluctant birth of a new point of view.

So, to return to the early Greeks and among them particularly to the Eleatics and Herakleitos, the concepts of Being, not-Being, and Becoming are natural results of thought seeking an objective truth, a truth that knows no limitation of view, under the spell of the physical or cosmological standpoint, and they are all heavy with paradox, hidden when not exposed. Thus the Ionic philosopher, Thales, had tried to satisfy the demand of thought for unity with a single physical element, water, and his immediate followers, after vacillating somewhat among the elements generally, were brought to the idea of the Boundless—*τό ἄπειρον*—a great all-inclusive element that could stand for all only by being none. This notion of the Boundless, however, of one thing that was no single thing, a startling paradox when really faced, was in truth teeming with many possibilities, some of which the Milesians themselves partially thought out,[1] but by Xenophanes, father of the Eleatic philos-

[1] The negative, for example, in the idea of the one thing as no single thing is significant beyond its mere effect upon the conception of a constituent unity. Indeed, it really makes the unity more than constituent, turning it from a static to a dynamic conception, from a passive to an intrinsically active principle; for the one thing that is no single thing must be a potential thing; that is, potentially it must be everything. And Anaximander felt this and added in consequence to his doctrine of the Boundless the doctrine of a process, the constant separation of individuals out of the primal unity. So did the potential ever become actual. The resulting individuals, however,—and this also for Anaximander—were necessarily opposites in every case, they were actively opposed to each other, since only by such opposition, by such counter-compensation, could either the primal unity or its negative be properly conserved. And the *active* opposition mingled with the process of separation a compensating process of unification or adaptation. "And into that from which things take their rise they pass away once more, as is ordained, for they make reparation and satisfaction to one another for their injustice, as he

ophy, it was regarded as purely, unmixedly physical, and, in consequence, was by him developed only on the side of its sheer—static? —reality and unity. Only Being is, he proclaimed, and Being is homogeneously and indivisibly one. On good evidence Burnet has identified this Being with the plenum, that is, the one immobile all-filling thing.[1] Not directly, however, on anything that any of the Eleatics openly said about Being are we here to fix our chief attention, but on the apparently unconscious or only half-conscious paradoxes to which their philosophy was finally reduced. Thus their One was also many; their plenum, vacuum; their Being, not-Being; and their Infinite, finite. Into such darkness did their persistent physical and cosmological point of view bring them.

Their One was really many for no less a reason than that they opposed the Many to it. Extreme opposition is even worse than politics for making strange bed-fellows, since it ends by making the principals themselves lie down together. The One that remained after complete abstraction of the Many could not but be wholly formal or empty; and so, although perhaps still extensively one, it was intensively many. A moral character that owes its unity or integrity to separation from the temptations of the world is virtually, or intensively, a dissipated character, as the outcome shows, when contact with the world comes, and what is true of unity in morals is equally true of unity in a doctrine of substance. Moreover, not only was the Eleatic One virtually—or potentially? —many, but also the converse was true. A manifold that owed its plurality to the abstraction of unity could be a sphere of only the most indifferent differences, that is to say, of differences wholly passive with reference to each other, so that the Many, albeit extensively plural, was intensively one. So, then, the two concepts

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[Anaximander] says in these somewhat poetical terms." The negative unity, then, its potential or dynamic character, its conservation or preservation only through expression in opposed individuals and its process of unification, were concepts that were logically inseparable; and although these suggestions of Anaximander seem to have been made only for a time to be neglected, the very logic that induced them was bound soon to assert itself, as it did in the subsequent philosophy of Herakleitos, whose concept of Becoming is to receive attention in the present paper.

[1] See *Early Greek Philosophy*, p. 189.

of the Eleatics, the One and the Many, directly opposed as they were, were nevertheless mutually inclusive.

But, secondly, the plenum was vacuum. Thus we may rightly think of it as the greatest among all things, the all-filling thing; but this is only one view of it. Another view, having equal warrant, is made necessary by the very plenitude. It was also the all-containing thing and so was immaterial relatively to the many material things in it. The greatest thing, necessarily including all other things, however plenal within itself, could not but be empty in respect to their fulness. Simply it could not meet the demand of the physical view that it be at once one different thing among other different things and the unity of them all, that it be the greatest thing and at the same time include all other things, without harboring this contradiction.

And, thirdly, Being was itself not-Being; or, conversely, not-Being was also Being. Of course, these ideas were interdependent or significant only relatively to each other, and such dependence would make complete confusion and paradox, but the meaning here is something more. Logically, as the Eleatic philosophers themselves came to realise, the concept of not-Being was necessary to that of Being; the Eleatics even used the argument to absurdity, showing the impossibility of not-Being, and this necessity or the importance of such an argument could only give a hint, however imperfectly or distantly understood, of quite another sort of reality than that of physical substance. Physically the world of not-Being, that is, the world of change and multiplicity, was shown to be unreal, to be illusory, to be real only ideally, but as always with ideas of unreality or philosophies of illusion, the standing notion of reality itself, of Being and unity, was put in jeopardy. To have found illusion was to feel, if not clearly to see, the need of viewing reality from another standpoint, from a standpoint not physical or at least more than merely physical. Or again, the physically unreal could not be ideally or logically real without at once upsetting the stability of the physically real.[1] In short, then, by its own

[1] Or, as another way of putting the same truth, without at once making necessary a new idea of the physical itself.

opposite Being was either robbed of reality or given the sort of reality, namely, that of mind or spirit, that logical necessity or the ideal reality[1] of the physically illusory would suggest. And this only adds to the meaning of what was found above, namely, to put it paradoxically, the physically vacuous character of the all-filling but also all-containing thing or the intensive plurality of an empty, formal One, for a vacuum, like mind, is immaterial, and an intensive plurality is possible only to the unity of mind, which transcends the limitations of extensive quantity.

So, fourthly, the Infinite of the Eleatics was finite; the Finite, infinite. Before considering this, however, we need now to formulate and emphasise a principle that has been well exemplified in the foregoing. Opposites, such as the One and the Many, Being and not-Being, Plenum and Vacuum, in the first place reproduce each one within itself the very opposition that separates them and in the second place give, each to the other, another meaning. In a word, each is always self-opposed and double.[2] Thus above in every case we not only found each opposite in the other but also were brought to recognise, or at least to a point where we might have recognised, that each had two meanings, one open and the other hidden. We might have seen, if we did not see, two kinds of unity and plurality, two of plenitude and vacuity, and two of reality and unreality. And, to return to the Eleatics' fourth paradox, the antithesis of the Infinite and the Finite has the same fate. Each of the two is in itself the other, and each gets from the opposition a second meaning. Moreover, even the Eleatics, or at least some of them, seem to have realised this; else there was no rhyme or reason in their assertion that the One or Being was "neither finite nor infinite," being both. Some, I know, insist that the evidence of such an assertion is very meagre or even wholly wanting, but it nevertheless remains that as a school the Eleatics were in disagreement on the point in question, some flatly denying the infinity and others the finiteness of Being, and their disagreement

[1] I. e., reality in experience.

[2] This principle I have made use of already in another article. See "Physical Psychology," *Psychological Rèview*, March, 1900.

may fairly be taken as equivalent to the statement that Being was "neither finite nor infinite." And, logically, which is to say consistently with the real trend and import of Eleaticism, any Eleatic might have made the assertion, whatever may or may not have happened to be said or reported as said. Indeed, history can ill afford to depend wholly on visible evidence, which is at best only "circumstantial." But, leaving the genuineness of the saying to the antiquary, we have only to ask what precisely is meant by being "neither finite nor infinite," and particularly what is the second meaning that this paradox must convey. Merely to appeal to the general principle of self-opposition and duplicity can hardly be expected to make all things clear.

As suggested already, what is neither finite nor infinite must somehow be both; yet how both? That the infinite as not the finite, as outside of the finite, is itself only another finite is obvious and commonplace. The finite, also, relatively to its finite opposite is itself infinite. And the two are thus necessarily mutually inclusive or identical; a curious result, truly, but not to be gainsaid. "Yes," says some one, "but only by dint of a philosopher's ingenuity, of his skill in mere logical gymnastics. To common sense the infinite never can be and never shall be said to be finite, as if forsooth, since by the same token it would really come to this, any smallest part of anything should contain the whole." But we reply that even any smallest part does contain the whole; for is not any part always something more or other than a merely quantitative part? Philosophy appears "ingenious"—certainly a strange mark of shame, it appears skilful in the antics of logic, whenever its thought has outgrown the prevalent traditional form for the expression of thought. Thus, for the case in hand, the whole-containing part or the finite infinite or the infinite finite, however absurd quantitatively, is nevertheless burdened with a real meaning, the very absurdity being due only to the broadening and deepening of the idea of quantity that the concept of infinity effects. What idea is not destined to be broadened and deepened into something more than itself? What idea must not sooner or later end in apparent absurdity? Quantitatively, part and whole may not be coextensive,

but they certainly are so qualitatively; else there were no significance in their being part and whole. Broadening and deepening the idea of quantity, then, by that of infinite quantity, only disclose the fact of quality in the world of quantity, or as equivalent to the same thing, materially change the idea of quantity itself. In short, the opposites, the finite and the infinite, are not only each one self-opposed, but also double. They are double with two forms or "categories" of thought, or with two notions of quantity.

The two "categories" are of course quantity and quality; the two notions of quantity, that of quantity as mass and that of quantity as ratio. That quality is "neither finite nor infinite," being both in that it quite transcends the peculiar limitations of mere quantity, of quantity as mass, is commonplace, but the ratio too, however fixed or constant or even because fixed or constant, is equally independent of these limitations and so is "neither finite nor infinite" also. Thus the triangle is a triangle quite without regard to its size, for mere mass is not even necessary to its being, as many operations in mathematics have borne witness; only the ratio in the constant sum of the interior angles is necessary to its triangularity; and what is true of the triangle is similarly true of any number or of any geometrical figure whatsoever. Recall, too, that in the history of mathematics, unless I greatly misunderstand, the clearly conscious use of quantity as ratio followed upon the recognition of incommensurables and the employment of the infinite "limit" which incommensurables made necessary. Quantity then became ratio because from the standpoint of infinity it had in the first place to be separated from sheer physical mass, and in the second place to be given the relational as opposed to intrinsic value which belongs to the ratio. The infinitesimal is preëminently not mass but ratio.

So we see what the opposition of the finite and the infinite was burdened with and accordingly in just one more way what was lurking in the Eleatic philosophy. Eleaticism was all but at a point of saturation, when precipitation would be inevitable, when the physical, cosmological point of view would have to be abandoned and succeeded by a view that would openly recognise the

second meaning with which the different opposites are now seen to have been pregnant. And no consequence to Eleaticism of the One being "neither finite nor infinite" can be more significant than its reduction of the physical or materialistic monism to a mere bubble that was likely to burst at any moment and become at once, as if the reverse and obverse of each other, materialistic pluralism and idealistic monism. So good an Eleatic as Melissos was keen enough to say: "If there were many things they would have to be just of the same nature as the One;" and, although this was hardly intended as even a concession to pluralism, yet, like all assertions of its kind, in which an opponent's view is admitted for the sake of argument, it put Eleaticism upon the thinnest of ice. Thus Burnet has declared[1]: "What appears later as the elements of Empedokles, the so-called 'homoeomeries' of Anaxagoras and the atoms of Leukippos and Demokritos is just the Parmenidian Being. Parmenides is not, as some have said, the father of idealism; on the contrary, all materialism depends upon his view of reality," and this is true so far as it goes and it shows how thin the ice was. It is true except for its assumed superiority over those who have seen in Parmenides or in Eleaticism generally the progenitor of idealism. Surely materialism was never born alone. Materialism and idealism were twins.[2]

Still a fifth paradox, not yet even mentioned here as belonging to the Eleatic philosophy, might profitably be considered. The one plenal thing, that is, Being was immobile and consequently motion was illusory, belonging like plurality to the sphere of not-Being. In rest and motion, then, we have two more opposites of which self-opposition and duplicity may or rather must be true, but how? The denial of motion to Being was (1) in consequence of the plenum seeming necessarily static or (2) in consequence of space's infinite divisibility making either the shortest distance infinite or the limits of the longest contiguous, and only by examina-

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[1] *Early Greek Philosophy*, p. 194.

[2] A study in the logic of Greek pluralism as formulated by Empedokles and Demokritos was published in the *Philosophical Review* for May, 1901.

tion of these premises can the conclusion to which they led be understood. The argument from plenitude is a familiar one, for to many others as well as to the Eleatics the world has seemed too full for motion; but what can such an argument mean if not that something besides extension, that is, besides mere change of position in a massive or purely extensive space, must be really true of motion? Not motion is impossible in a plenal world, not a plenal world must be absolutely passive, but instead the motion of a plenal world must be intensive as well as extensive, or—with reference to the change it manifests—qualitative as well as quantitative, or perhaps, as the terms are sometimes used, chemical as well as physical. Moreover, physically a plenal world is hardly conceivable as a passive world in the sense of a world physically at rest, since the *perfectly* passive must always be acted upon from without and could not accordingly be plenal or immobile. But the argument from the infinite divisibility of space, the natural sphere of motion, is more interesting and possibly more obviously serviceable to our present purposes. Thus there can be no shadow of doubt that motion in so far as extensive becomes rest in an infinite space, in a space of infinite infinitesimal parts; but why should it not? At infinity the quantity of which space is made is, as we have already been reminded, not mass but ratio, and in a space made of quantity as ratio, motion far from being unreal only gets another meaning and even a deeper reality. Or, again, the pause or rest that space's infinite divisibility gives to extensive motion cannot be a negative of motion in the sense of something that excludes motion; it is, on the contrary, an essential character or property of motion itself just as infinity was necessarily in and of the finite, not apart from it, or as ratio was an inner truth of quantity, not a denial of it. Achilles was very swift and the tortoise was very slow, but in a space of infinite massless parts or points Achilles could never appear as overtaking the tortoise, because in such a space, not the actual distances traversed, but the ratio of the distances traversed, was really the significant thing and the ratio was a constant. The motion, then, was *also* rest. You do not see this? Then you have not seen that at infinity quantity, which here is distance, is significant

only as ratio. Zeno himself may not have understood the rest, to which he reduced motion, in just this way, he may not have appreciated the distinction between mass and ratio and its origin, so to speak, from the projection of quantity to infinity, and more recent logicians and mathematicians, however much they have profited by use of the idea of infinity, may not have seen in infinity anything more than the absolutely large or the absolutely small, but this is no hurt either to the real effect or to the real import of infinity itself. Simply projection to infinity makes quantity only ratio and in a space of quantity as ratio motion is rest. The projection reveals intension in what had seemed only extensive.[1]

So, like the other opposites in Eleaticism these two, motion and rest, were mutually inclusive or self-opposed and double,[2] and with this final evidence before us of the inner truth of the Eleatic philosophy we can pass with confidence to the consideration of the conception of Becoming in which Herakleitos sought to unite the Eleatics' opposites. Indeed, in the self-opposition and duplicity we have in the first place a perfect justification of Herakleitos and in the second place a direct and thoroughly obvious indication of the import of his notion of Becoming. Herakleitos was truly a "dark philosopher," but after all is said his obscure deliverances were only an open, public expression of what was private and hidden, or if even recognised at least not understood among the Eleatics.

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[1] Projection to infinity seems to me to be only a process by which the constructive or constitutive principle of a series is positively asserted *as a principle* if not actually abstracted, the abstraction, of course, being from *all* the particular cases to which the principle is applicable. At infinity we have, not another term or case, for an infinite series has no last term, but the order or system or at least what really amounts to a disguise or indirection for the order or system of the series. See also a short article: "Professor Fullerton on the Doctrine of Space and Time," in *The Psychological Review*, March, 1902.

[2] In summary the opposites, the One and the Many, were double, with extensive and intensive or potential and actual unity and plurality; Being and not-Being, with reality as physical and as ideal or logical; plenum and vacuum, with the fulness or unity of matter and of mind; infinity and finiteness, with quantity and quality or quantity as mass and quantity as ratio, and motion and rest with motion or rest as physically absolute and as only relative or as extensive and intensive.

Of Becoming, then, two things are necessary. It was very far from being an unmixed physical conception, and it was no nearer to being wholly idealistic. Both to those who would emphasise Herakleitos's selection of fire instead of water or air for the first principle of things, and would consequently make a somewhat tardy Milesian philosopher of him, and to those who would commit that other anachronism, even more violent, of finding him a well-developed forerunner of Hegel, we have only to say that such interpretation has little if any respect for history, logic, or common-sense. Was Herakleitos a hylozoist or in the pre-Socratic sense a materialist? In any sense, was he an idealist? Our foregoing analysis of the opposites which Becoming unified and of the conditions or logical implications of opposition generally, can suggest only that Herakleitos was neither materialist nor idealist, and that he was neither because both, and both at a time when mind and matter had been separated, but without anybody really knowing, really having the eyes to see, what had been done; such was the spell of the cosmological point of view. Above, it was said that materialism and idealism were twins born of Eleaticism. They were and the philosophy of Herakleitos was a contemporary of Eleaticism rather than a follower; and with its obscurity, paradoxes, apocalyptical deliverances and all, it must stand in history for a not unwarranted and certainly not unnatural protest against the dual life that philosophy had in promise, that was already at the hour of its coming. Becoming, neither any mere physical process nor any pure principle of dialectic, was the always equal struggle of the physical and the spiritual, of body and mind; it was that double process, with its "way up" and its "way down," which in these days one can style only mind and matter interaction; it was the poise of consciousness, at once sensuous and rational; only—and this is the important qualification—for mind, for the spiritual or rational Herakleitos and his contemporaries had only the indirections of physical abstraction and paradox. And how could Becoming be anything else, when the opposites, which were its recognised factors, were themselves alive with all the conditions of dualism?

In conclusion it would be interesting to bring the electricity of

these philosophies down from the clouds of logical subtlety to the earth of the Greek life of the time; for opposition with all its logical implications was developing rapidly in the relation of Greek and Barbarian, and, through the art that their conflict stimulated, the consciousness of Greece assumed just that poise of the sensuous and the spiritual or of the passing and the coming, which Herakleitos, however mystically and philosophically, recounted in his conception of Becoming. But to many, fancies such as these are mere fancies, idle perhaps in any place, and in a logical study like the present most impertinent.

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PAGAN ELEMENTS OF CHRISTIANITY; AND THE SIGNIFICANCE OF JESUS.

IN CHRISTIANITY we must distinguish between the underlying thought of a saviour and the belief in Jesus of Nazareth as having been this saviour. The latter is now known under the name of Christianity, but it is ideally and to a great extent at least in Protestant countries also actually a Jesuanity, viz., a Church institution based on Jesuism, i. e., the personal teachings of Jesus.

The ideas of Christ and Christianity existed before Jesus, and the Christianity of the Church was one form only of Christianity among many others; and that many other Christianities existed is evident from the fact of the various Christ-conceptions which are offered in both canonical and Apocryphal books—not to mention the innumerable pagan saviours and redeemers, gods such as Hermes Trismegistos, Hercules, Æsculapius, Mithras, etc., and men such as Apollonius of Tyana. We must bear in mind that the traditions which are still extant are only isolated *débris* saved by accident from the general deluge of all non-Christian religions.

The term "Christ" in the sense of Saviour makes its first appearance in history in the Septuagint and the Apocryphal books of the Old Testament. It translates the term Messiah and occurs twice in the Psalms of Solomon (xvii. 36 and xviii. 8). St. Paul applies it to Jesus in his Epistles, and he too regards the term as a Greek translation of the Hebrew word Messiah, the Anointed One. Nevertheless, the derivation is doubtful, for the Anointed One would be χριόμενος, or κεχριμένος, or χρισθείς. The form χριστός or χριστέος is a gerund which means "he who is about to be or

ought to be anointed."[1] Consequently it cannot very well mean the Messiah, but only the one who will become the Messiah.

Justin Martyr, of the second century, occasionally uses the form χρηστός for χριστός and alludes to its significance as "the useful, the serviceable, the good."

Some have tried to connect the word Christus with Krishna. Now it is true that a few Krishna legends (e. g., the massacre of the innocents) and some features of the Krishna birth-festivals were practically identical with legends accepted by the early Christians,[2] and we must grant that Krishna-worship had reached Syria and Egypt, but there is not the slightest positive evidence in favor of the assumption that the name itself should have been used in the sense of God-man and Saviour, and still less that Krisnos became changed into Christos. We deem the etymology of the word Christ to be an open question.[3]

The Book of Enoch, the main part of which was probably written about 144 B. C., does not regard the Messiah as a man but as a divine personality, a prince among the angelic host,—one who ranks above all the angels, yet is not quite equal in dignity to God. Jewish tradition has the conception of such an angel, called Metathron, who stands at God's side near his throne to execute His will.

The Books of Ezra propound another saviour-conception, which is, however, as little conformable as that of Enoch to the Jesus-Christianity which remained victorious in the end. The Jesus-Christianity originated under other conceptions of a messiah through a peculiar combination of definite historical circumstances,

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[1] The verb χρίειν means "to rub"; i. e., lightly to touch the surface of a body; "to bedaub." It is commonly used in the sense of smearing the body with oil, as the Greeks were used to do after a bath. But the idea of "rubbing" is fundamental. The word acquired the meaning of anointing as an act of consecration only through its use in the Bible, and it is probable that no one save a Jew would have translated Messiah by χριστός or any other derivative of χρίειν.

[2] See Prof. A. Weber's article on the Krishna birthday-festival. Engl. transl. n the *Indian Antiquary*, June, October, and December, 1877.

[3] The formation of the word χριστιανός, or Latin *Christianus*, is a solecism which can scarcely have occurred before the last decade of the first century. For further details of the mooted question see R. A. Lepsius, *Ueber den Ursprung und ersten Gebrauch des Christennamens*. 1873.

and embodying in itself all those traits of other Christianities which possessed a practical and moral significance, it grew in breadth and was thus enabled to survive. But the strangest thing is that the New Testament contains a book with passages based upon a Christ-conception that knows nothing of Jesus of Nazareth, nothing of the Atonement through death on the cross, nothing of the details of the Jesus-worship preached by Paul, set forth in the four Gospels, and sustained in the epistles of the various apostles.

This Christ-conception, utterly incompatible with the Jesus of the New Testament, is contained in the Revelation of St. John, chapter xii., which (if viewed from the standpoint of the old and uncritical school of theology) is one of the obscurest passages in the Christian canon.

Recent investigations have thrown much light on the significance of the text. Several theologians of the critical school have recognised the non-Christian (or rather un-Jesuanic) origin of this passage in Revelation xii. But Professor Gunkel has finally succeeded in explaining the significance of these strange traditions.

The Saviour is represented in the twelfth chapter of the Revelation as being born in Heaven (not in Bethlehem or anywhere on earth), and he is at once attacked by a dangerous dragon; the child is rescued and taken to the throne of God, while the unfortunate mother is persecuted by the monster. The dragon in his wrath throws down one third of the stars in Heaven, and a combat ensues between Michael and the dragon. Later on, in the continuation of the prophecy, which is found in chapter xix., the child reappears as a hero who fulfils the prophecy (chapter xii. 5) that he will govern the nations with a rod of iron and found the kingdom of God on earth by a most terrible slaughter of the Gentiles. During the infancy of the Saviour, the dragon is at liberty to do much harm, and the time of tribulation is near, but the victorious conqueror is expected and will at last vanquish the monster of the deep.

All attempts to reconcile this picture of the Saviour with that given of Jesus in the Gospels have failed. The woman who is the mother of the Saviour appears in Heaven adorned with celestial insignia, not as Mary of the tribe of Levy and betrothed to Joseph,

but as a deity of Heaven, like those described in pagan mythologies, standing on the moon and crowned with the zodiac, a wreath of the twelve constellations. Nothing is mentioned of the Crucifixion, nothing of the Resurrection, nothing of the preaching of the Word on earth, nothing of the miracles of Jesus, of healing the sick and restoring the dead to life.

That the religion of the prophet who wrote the passage in the twelfth chapter of Revelation is not the Christianity of the four canonical Gospels is obvious, and we have here the remarkable phenomenon of a Christianity which lacks utterly all those significant features which characterise the humanity of Jesus and his special fate in life. We are apparently confronted in this passage with one of the relics of a pre-Christian Christianity, such as it existed among the pagans with whom the Jews came into contact.

Professor Gunkel has proved that the essential features of this pre-Christian Christianity of the twelfth chapter of Revelation are nothing but a recital of the Marduk myth. But genesis has become here eschatology. The report as to the origin of the world is applied to the end of all things and to the renewal of the universe. The chaotic conditions of the age, in which the elect of God suffer and the unbelievers triumph, will be reversed and a new heaven and a new earth will be created, for which the resurrection of the dead is promised and a general restitution assured. The channels through which the old Marduk myth has been transferred to Jewish writers can perhaps no longer be traced back to their sources, but we can plainly recognise Zoroastrian influences and the Persian views of the virgin-born saviour who will found the kingdom of God on earth.

The age was well adapted to eschatological contemplations. Under the influence of ancient prophecies dating back to the Babylonian period, and repeated in purified form in the Zoroastrian writings, a whole flood of apocalyptic literature appeared in which the Jews dreamed of a restitution of the Jewish race and a fulfilment of their national ideals. The oldest of these revelations, Daniel, set the example, and most of them breathed a spirit of bloodthirstiness and revenge. They are written by a race that has

suffered greatly from oppression and persecution; and the truly Christian spirit is utterly absent in them. This, no doubt, is the reason why in the general competition of religious ideas which in those days moved the world, that form of Christianity which is exhibited in the twelfth chapter of the Revelation of St. John failed and was superseded by the other Christianity which, as stated above, might properly be called *Jesuanity*.

One question remains: How was it possible that this chapter could be incorporated into the canonical writings of the New Testament? The answer seems to be this: First, the un-Jesuanic character of the Revelation of St. John is not so obvious as to be at once perceptible to a person reading these chapters or copying them for preservation. They are intermingled with a conglomeration of other chapters full of mysterious hints and prophecies which tend to conceal their true significance. The final redactor of the book knew of the existence of Judaistic Christian congregations in Asia Minor, and there can be no doubt about their anti-Pauline character; yet the opposition made to the apostle Paul is not made openly, but indirectly, by allusions which rendered it possible that it could at last be received into the canon, in spite of its anti-Gentile tendency.

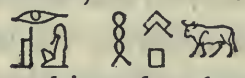
Being canonised, it escaped the fate of suppression when another form of Christianity survived in the general struggle for religious supremacy. Any one who can judge impartially between the two religions must confess that this Marduk-Christianity was bound to succumb in the competition with the nobler, and morally deeper, Christianity of Jesus the Nazarene. The Marduk-Christ is a mythological figure, a god of the ancient Babylonian fairy-tale world, but Jesus of Nazareth is a man, an aspiring, suffering, and down-trodden martyr. There the divinity of the conqueror is grotesque, here it is human; and because it is truly human, it was felt to be truly divine.

In addition to the Marduk Christianity of Babylon, preserved in the twelfth chapter of Revelation, there are Egyptian conceptions of Christ, and even here the name Christ is attested by good authority.

We learn through Sozomenes and Socrates the Church historian, that the cross was used as a prominent symbol (probably the Egyptian *crux ansata*, the key of life) in the temples of Serapis, and Emperor Hadrian writes in a letter to the Consul Servianus:

"Those who worship Serapis are Christians, and those who are especially consecrated to Serapis call themselves the bishops of Christ."

The Rev. Robert Taylor in his *Diegesis*, p. 205, believes that the use of the word Christ is a confusion due to the fear of persecution, and that many Christians, to escape martyrdom, professed to be Serapis worshippers. But the case is the reverse. Not Christians call themselves Serapis worshippers, but Serapis worshippers claim to be Christians. The Emperor's expression does not admit the interpretation that the name Christian was disowned, and we have only the choice that either there was a confusion of these two religions in the mind of the Emperor, or there was actually a class of people in Egypt who worshipped Serapis under the name of Christ.

Serapis is the god of the other world, the life to come. The word is a contraction of Osiris-Apis  Ausar Hapi, i. e., the apis as Osiris, and he was worshipped as lord of the dead.

The Serapis cult was a Hellenised form of the ancient Osiris worship introduced by King Ptolemy Soter for the purpose of reconciling his Greek and Egyptian subjects. A monastery was connected with the Serapæum at Memphis, as we know from papyri found on the spot, and Christian monks adopted some features of the habits of these monks of Serapis. It is certainly not accidental that the institutions of Christian monks originated in Egypt.

Christianity as the faith of the Church is a belief in Jesus of Nazareth as the Christ, and the life of Jesus as told in the Gospels has exercised a paramount influence upon the formation of the creed. Nevertheless, several of its main ideas were added to from other sources. Christianity is not pure Jesuism; Christianity is the religious life of the pre-Christian ages focused round the idealised figure of Jesus. Jesuism is the dominant factor of Christianity; but some of the rays collected from other quarters are not merely accessory. Jesus is the center of crystalisation, determin-

ing the interpretation of the various elements that were assimilated, but some of the more essential thoughts of Christianity are not found in the doctrines of Jesus and must be regarded as independent accretions which on account of their vital importance in the minds of the people naturally and necessarily were incorporated in the new system.

Among such later accretions coming from sources of pre-Christian religions are the dogma of the trinity, the conception of the sacraments, the incarnation idea, the doctrine of vicarious atonement with its peculiar scheme of salvation.

The idea of vicarious atonement, which underlies the sacrificial cult of Paganism as well as Judaism, reappears in the interpretation of Christ's death. Although Christianity is in a certain sense reactionary, in *de jure* recognising the necessity of human sacrifices, it is *de facto* progressive, for instead of continuing the barbarous practice, it served to abolish bloody sacrifices for good. Similarly the superstition of the ceremonial cannibalism of the savage age (based on the thought that by eating the flesh of any creature or by drinking its blood we partake of the powers of which it is possessed) was revived in Christianity, but it became a mere symbol and obtained a deeper and spiritualisd significance. The divinity of the ideal man, representing the civil order and the moral welfare of the community, so vigorously insisted upon in the deification of the Roman emperor, found expression in the dogma of the God-man Christ. These thoughts assumed a more ideal aspect under the humaner ethics and the loftier philosophy of the age which rejected the idolatry of the past and began to look upon God as the one deity, the father of all, who with the same love embraces the noblest as well as the meanest of his creatures.

The trinity, or rather tri-unity of God, which is nowhere mentioned in the New Testament, was even in its purer forms quite common among the philosophers in the age of Jesus. Thus, for instance, the *Chronicon Alexandrinum*, explains the name "Hermes Trismegistos," (Ἑρμῆς τρισμέγιστος), who in Egyptian mythology is Thoth, the scribe of the gods. He is regarded as the revealer of divine mysteries and a shepherd or pastor of mankind (ποιμάνδρης);

thereupon it proceeds to make the following statement: "Hermes declared that there are three greatest powers (δυνάμεις), but he said that the name of the Ineffable and the world-building God (δημιουργοῦ θεοῦ) consisted in one divinity. . . . Therefore he was called by the Egyptians thrice-greatest Hermes."

The thrice-greatest does not mean the triple-greatest, but it indicates a reverence for the number three. The quotation proves, however, that the name Hermes Trismegistos and the trinity doctrine of Hermetic literature must be older than the *Chronicum Alexandrinum*, but there is a strong probability that this notion as well as other ideas set forth in the Divine Pymander of Hermes Trismegistos have been derived from ancient Egyptian sources.

The word "power" or δύναμις is also used in the New Testament in connection with Simon Magus whose doctrine of the trinity is remarkable for its purity and philosophical grasp.

The doctrine of the God-child Hor, who was worshipped as a saviour and as a promise of resurrection in Egypt, is very near to the Christian conception of God the Son.

Nothing was absolutely new in Christianity, yet the whole setting was original, and in this new synthesis the traditional religions were purified and their barbarous features were, at least in their practical application, abolished. The more we consider the conservatism of mankind, the better we shall understand that the simplest and most effective way of abolishing ancient rites such as atonement by blood, was by granting their propriety for the past, by claiming them to be fulfilled, and thus abolishing them for good, without denying their justice.

In spite of the great progress which Christianity denotes in history, we cannot fail to see that early Christianity was by no means so ideal as it appears to the Christian romancer, for on the contrary, early Christianity contains many superstitious notions which cannot be reconciled with its great humanitarian and universalistic ideals that form the leaven in the dough of mankind.

But the most important idea of Christianity is the belief in the immortality of the soul, and here we must observe the noteworthy fact that this doctrine is glaringly absent in the Old Testament.

Although the Hebrew canon contains many traditions, notions, and beliefs which can be traced to pagan sources, be it in Egypt or in Mesopotamia, there is a decided contrast between the spirit of the Old Testament and the religious literature of the Babylonians and other nations. The Hebrew prophets and the priests of the second temple are iconoclastic monotheists and haters of myth in any form. Thus, they have rationalised the creation myth, the story of Marduk's fight with the dragon, the legends of Samas the sun-god, changing him into a hero and a judge called Samson, etc.; and in doing this they passed over in silence the belief in immortality, or, wherever it is alluded to, we can still recognise unmistakable hints condemning the pagan conception of life after death.

The objection which is made to the belief in immortality by the canonical authors of the Old Testament seems strange to us, who have acquired the custom of reading the Hebrew Scriptures in the light of the New Testament doctrines, among which the belief in immortality is the keystone of religion. But we shall understand the situation better when we consider the intimate connexion of the belief in immortality among the Babylonians with the worship of Tammuz and Istar. The wailing for Tammuz was a kind of All Souls' day, and the hope of the bereaved for a restoration of their beloved dead to life was based upon myths and celebrated with idolatrous incantations (probably after the fashion of modern mediums) which were an abomination to the sober and rationalist Yahvist.[1]

Christianity not only abandoned the Jewish policy of ignoring the problem of immortality, but denotes a decided restoration of pagan beliefs in a new and higher form.

When Christianity spread over Syria, the religious ceremony of lamentation for the death of Tammuz and rejoicings for his revival were changed into Christian festivals, viz., into the lamentation on Good Friday for the death of Christ and on other occasions into a celebration of the death and resurrection of Lazarus. The old

[1] See the author's article "The Babylonian and Hebrew Views of Man's Fate After Death" in *The Open Court*, 1901, pp. 346–366.

pagan belief and even the story itself continued in the imagination of the people, but under different names.

Pagan ideas were critically revised and chastened in the furnace of Jewish monotheism, and the result was Christianity. Thus the saying of St. Augustine remains true that Christianity, the new religion that so suddenly conquered the Roman Empire and crowded out Greek and Roman mythology, was, after all, an ancient institution which had existed from time immemorial.

There are many indications of a fierce struggle between the several forms of Christianity, but the result was no accident. The Jesus-Christianity proved victorious as soon as it became known in the world, first through the Apostle Paul and then in the shape in which it was presented in the Gospels. It rejected everything that collided with its essential doctrines, but assimilated freely whatever could be reconciled with the teachings of Jesus.

Jesus being a historical fact and a human saviour, a suffering man and flesh of our flesh, was finally recognised as the only Christ. All other Christ-conceptions were abandoned and doomed to oblivion. The myths of Marduk, of Tammuz, of Thoth, of Osiris, of Horus the god-son, and further of the great mother of life, the Queen of Heaven, and other pagan stories, are products of deep human sentiments. They are as significant as is the awe inspired by the idea of the creation of the world, the yearning for life immortal, the respect for *das ewig Weibliche*. But literal belief in the myth led to superstition and aberrations which needed constant purification. Thus the Judaistic suppression of these rituals is as much justified as is the broader spirit of reinstating them. The rise of Christianity in Judæa may very well be regarded as a reaction, for it is practically the restoration of the most essential pagan beliefs in a new and monotheistic form. Considering the power of the hope of immortality and the fascination of the more poetic forms of pagan worship, we believe it was an inevitable phase in the history of the religious evolution of mankind. But Christianity, although it was nourished by aspirations which have their roots in pagan soil, is not a mere reversion to paganism; it is after all a new epoch in the history of mankind. Though it contains ingredients which can be traced back to the traditions of a hoary antiquity, it is a distinctly new movement; and the event which becomes its center and dominating factor, constituting its originality, is the life of Jesus.

EDITOR.

LITERARY CORRESPONDENCE.

FRANCE.

M. RENOUVIER, the indefatigable dean of French philosophy, takes up and develops in his *Histoire et solution des problèmes métaphysiques*, of which we shall speak at some length, the history of the philosophy which he broadly sketched in his *Dilemmes* (see *The Monist* for July, 1900), or, to be more exact, "the history of the most general principles of metaphysical speculation, on which all the main topics of philosophy depend." This history, as he understands it, is the search for the elements of idealism which emerge into light from the obscurity or errors of realism, until a stage is reached by a necessary evolution of thought in which the realistic point of view is abandoned by philosophers, who thenceforward openly adopt the idealistic view in its entirety. He offers this to us as a means of access to the neo-critistic doctrine, his own creation, such as it has taken shape in the meditations of a long life.

The name *realism*, by an extension of a scholastic term denoting the attribution of reality to "Universals," is applied here to the method of "realising" concepts, of which philosophical speculation has nearly always remained the slave,—a method which consists in establishing its own concepts apart from all consciousness and in realising them for the imagination as external objects given in themselves.

We know, moreover, that metaphysics is, in M. Renouvier's judgment, of all knowledge the most important branch for man,—that alone to which the name of philosophy properly belongs.

Distinct from logic and pure mathematics, as well as from the physical sciences, it embraces the study of the cosmos in all its generality, and that of the consciousness of self and of its functions, wherever these transcend the purely empirical investigations of psychology.

Substantialism, determinism, infinitism,—these are the doctrines that M. Renouvier impugns; relativism, contingency, the primacy of thought, these are the principles that he champions. His opposition is directed against all modern doctrines, whether confessedly dogmatic or fundamentally skeptical, which may be characterised as "vague pantheism" or "conscious atheism," and of which the obtrusive formula is, he says, "that the individual and the person are nothing but transitory appearances in the world, and that the universe is the development of the Thing, unknown in itself, manifested in the infinity of time and space."

The doctrine of *personalism*, which he so ardently espouses, maintains that ideas of "relation" are alone intelligible and are alone capable of intelligibly defining reality, "in that equation of thought and of existence which is truth,"—Relation being the name for Intelligence itself taken in the abstract, that is to say, a name of the Person considered in the totality of the laws which preside over all the modifications of consciousness and which suppose it. The subject and the object in the mental action are the terms of a relation. It is this relation itself that is consciousness or personality; and not only is this relation not unknowable, but it is knowledge itself apprehended at its very source, and *to know* is naught else than to establish relations in accordance with that fundamental relation.

It is incumbent upon the realistic doctrines of the absolute, contends M. Renouvier, to reconcile the contradictories of phenomenism and substance, of finite and infinite, etc. But they can never succeed. The logical principle of contradiction forbids the attribution of reality to every subject that admits of being conceived as a composite of modes, qualities, parts, or distinct terms, infinite in number, indeterminable, and actually acquired or given in all its unities.

Thus, the logical impossibility of an "actual infinity" constrains us to abandon the notion of substance, of extension in itself, so far as it may exist independently or apart from the phenomena of which it is the fictitious support. He would likewise persuade us to reinstate free will in the universe; for without freedom we are constrained to admit the necessary predetermination of all the future, "from which it would follow that the retrogressive course of causes is infinite, and that the sum of the phenomena that have taken place is an actual numerical infinity, the conception of which is self-contradictory."

Philosophy, it is true, cannot demonstrate the reality of free will. But the choice of philosophy between the two hypotheses is a legitimate act of *rational belief*. And, according to M. Renouvier again, the adoption of the principle of rational belief (in place of the *evidence* of the clear and distinct ideas of Descartes) is as justified as it is inevitable: it deprives of all their potency the arguments of the Kantain criticism against the demonstration of the existence of God and of the soul, based on the reasoning that the existence of an idea is not by itself a proof of the existence of the object of that idea. If Neo-Criticism at the beginning adopted the hypothesis of a plurality of consciousness and did not pronounce clearly upon the principle of the divine unity of consciousness at the origin of things, it threw light in the sequel upon this question by the idealistic consideration of the unity of the laws of mind; which unity, being identical with the unity of laws in the empirical world, implies the unity of the mind itself, of which the world is the creation, and thence by induction the unity of the first consciousness.

It would require too much space to point out in detail the different respects in which the idealism of M. Renouvier differs from other philosophical methods. With the two other systems known as idealism, it reduces knowledge to its mental subject. But it is at the same time careful not to disintegrate ideas into elements of which no synthesis can be made, and not to accept as fundamental ideas abstract and general terms, at bottom very complex, which should play the part of principles or of first causes.

From Berkeley, Hume, and Comte it borrows its relativism and refutation of ontological fictions, substances, and forces; from Kant, its theory of critical reason, and its reinstatement of logical synthesis, while rejecting Kant's noumena and his determinism. It criticises the entire empirical school for having misunderstood the characteristic laws of the phenomena of mind and for not admitting the necessity of concepts for the perception of relations and for the formation of ideas, and finally for having excluded will and belief from the elements of judgment.

Descartes is M. Renouvier's real and most logical predecessor, likewise Leibnitz; but not Kant. With Descartes M. Renouvier takes his stand on individual thought, on the *cogito* which involves being itself, and he then passes by the way of belief to the affirmation of the non-ego as an exterior existence, then to the affirmation of the soul and of God. With Leibnitz, he takes the point of view of monadism and pre-established harmony; but he invests the monads with contingency; and he banishes substantialism and absolute determinism, two doctrines, he says, "which alone make of the world of this philosopher an eternal and solidary whole, constituted of an infinity of substances mutually and invariably conditioned, one by the other, and by the eternal act of God."

One of the most interesting points of this new monadism is its conception of the soul. M. Renouvier cannot persuade himself to see in the individual a fleeting sensation only; he proposes accordingly to regard the synthesis of the phenomena of the ego as a law of these phenomena, which is perpetuated in time and does not find its termination in the organic forms to which for the time-being it is bound. We pass, by a sort of induction, from the idea of empirical synthesis to the idea and belief of a function constituted *a priori* at the beginning of things, and that induction is, properly speaking, the definition of the soul,—the identity and the permanence of the ego being understood as that of a function which is really the person, and not that of a substance without possible reality.

A bold view, which singularly transcends the "postulates" of practical reason, is the doctrine of the downfall of a primitive hu-

manity,—a downfall which the psychological laws connected with freedom render possible, if not inevitable, and the consequences of which were the introduction of death into the world, the dissociation of the physical elements, and the dissolution of the original system into a "nebulous state." But humanity equipped with knowledge and power, would be ultimately redintegrated by future revolutions in the world, in the midst of a celestial and reconstituted nature. "It is not society, which is an abstraction, but men or rational individuals, that are bound in apprenticeship to the moral life in society, and consequently on this earth; and this earth can be naught else for them than a point of further departure for another existence across the broad reach of creation ascending to its ancient condition of the perfected organism of the universe and of the complete harmony of forces."

Such is, crudely stated, M. Renouvier's system of rigorous idealism which finds its consummation in his necessarily conjectural cosmogony and eschatology. There is one fact that makes of us all idealists in some measure; I refer to the fact that man knows himself only as mind, or rather that the external world takes in our consciousness the form of the laws of our mind. Another question which immediately rises is, What, rigorously viewed, is the connection between our internal logic and the order of nature? If is clear that we cannot efface from things the marks of our sensibility, nor cast doubt upon the validity of our logic, it is on the other hand no less clear that we cannot consider the conditions of our sensibility and of our intellect as real states having outside of us the same signification, and assign a positive value to all the contradictory or limiting concepts which are the instruments and the means of thought. Thus, for example, while it is a logical contradiction for M. Renouvier to think of the world without a beginning, it is for all men a logical impossibility to conceive a beginning or an end. How shall we extricate ourselves from this difficulty, and how can we justify ourselves in referring from our mental condition—by the denial of an "actual infinity"—a doctrine of "creation" or anything else? Does not M. Renouvier transgress his own method when he seeks to deduce metaphysical affirmations from

the analysis of mental procedures, and if these affirmations satisfy him, have they in them the power of ever imposing themselves upon people who think differently?

On the other hand, the incongruences which subsist between realism and idealism will never prevent men from remaining naïve realists, and it is an act of realism, perhaps, to pass from a causality felt within us to a causality situated without us, to talk of an initial limit to things, etc.

In fine, M. Renouvier has presented us with an instructive and remarkable history of philosophy; it is a splendid effort on his part, and I know of no doctrine that has been so skilfully advocated. But it may happen that the reader, after having yielded to the sway of the author's arguments, will recover himself and not rest content with solutions to which the mark of human infirmity still remains attached.

* * *

Nothing is more interesting than a new subject treated with both originality and brilliancy, and this is the case with M. TARDE'S new work, *L'opinion et la foule*, which is made up of three studies bearing the titles: "The Public and the Crowd," "Opinion and Conversation," "Crowds and Criminal Bands." I shall say nothing of the last-mentioned study which M. Tarde reproduces here, because of its having been published prior to the works of other authors, although it is still interesting. The two other chapters are quite novel in their contents. The author seeks first to distinguish the public from the crowd: the crowd, a natural and spontaneous formation, demanding a direct suggestion, a "contact"; the public, an entirely modern creation, distinguished by suggestion "at a distance," and supposing a mental and social evolution far more advanced. Our era, he says, is not, as M. Le Bon would have it, an era of crowds; it is an era of the public and of publics. Crowds preserve their racial character and depend on physical factors, while publics have more independence and variety, and also more homogeneity and coherence. This social division, by groups of theoretical ideas which constitute the different publics, receives from the press a physical accentuation: the public is in the hands

of the journalist, and the latter does nothing more than to expand the ego of certain individual influences. The newspaper, I would say, serves as a vehicle for ideas which it does not create, and not too infrequently it even places obstacles in the way of ideas which it does not happen to adopt. Publics are therefore not less dangerous than crowds; they have with them the common qualities of intolerance, infatuation, and blind domination; they produce currents of impulsion which are always menacing to original creations.

The *absolute* difference between nations, continues M. Tarde, has grown less with the triumph of the press; their *relative* and conscious difference has increased. The book was the creator of the cosmopolitanism of the eighteenth century; the newspaper was the creator of the nationalism of the nineteenth century. The book interests by the abstract and general character of the reasons that it advances; the newspaper derives its interest from concrete actuality.

I have also noted, as M. Tarde does here, the fact of the reversion of modern man to his nationality, but I do not think that it is necessary to attribute it primarily to the power of the newspaper. It may be that the press will favor at some other period the cause of cosmopolitanism, as to-day it does that of nationalism. These facts are not due entirely either to the book or to the newspaper, and they have another meaning. For example, it is to be remarked in the first place that the nucleus of our nationalities has hardened in some measure with time, that the nations have become more condensed and concrete; and again that each nation, by the very fact of this solidification of its nucleus and through the increased facilities of commerce, has ended with acting as a single individual, as an interested individual which derives its force from community of action and feels menaced by whatever restrains or annoys it. As secondary causes for Europe, I would note the effects of the wars of the Revolution and of the Empire, which sowed the seeds of hatred and stirred profoundly the sentiments of patriotism, etc. In France to-day, and despite all, it is not nationalism in my opinion that is the peril and the dominating trait; but it is rather, under this appearance which is so deceiving, the pro-

found dissolution of the collective feeling, the marks of which are only too apparent.

M. Tarde's remarks on "Conversation" are very attractively put; he rightly sees in conversation the most important factor of opinion, and in the newspaper an amplified conversation. But I do not see with him so clear an instance of the "law of propagation of examples from upper to lower" in the fact that correspondence began between kings, popes, and princes, to be disseminated later among the most different strata of the nation. The means of conveying letters were at first at the disposal of the great only, and the interest in writing them existed for this class particularly. The rarer intercourse and travelling were, the more sedentary life was, the less the necessity of writing was felt in family circles, particularly in periods when people were more sociable and conversational. There are examples that we cannot press too much, even though they speak in favor of the best theses.

"Everything reduces to-day to purely psychological groups of states of mind," writes M. Tarde for example, *àpropos* of publics. What can the precise meaning of such a statement be? Does it involve a fact that is absolutely new, or that furnishes new arguments in favor of his sociological doctrine? And if it is permissible to contemplate social facts under the conception of an "interpsychology," what effective aid can sociological researches derive from this conception?

But this is a dispute that does not fall within the subject of the present work, and I should not have raised the point had not M. Tarde always shown so great skill in extricating himself from the objections which his critics have delighted in raising against his doctrine.

* * *

M. P. Souriau has a justly acquired reputation in esthetics. He attacks the subject, *L'imagination de l'artiste*,[1] with perfect competence. His book is interesting reading and replete with examples

[1] Published by Hachette, Paris. The other works mentioned are published by F. Alcan.

which he has borrowed mostly from modern artists with ingenious analyses and correct appreciations, where no bias calculated to falsify observation is discoverable. He has endeavored to show that the vocation of the artist, and especially his character, rests primarily upon the exceptional development of the imaginative faculties, not exclusive of the faculty of representation, but also the faculty of invention and of creation: *technical* invention, *dramatic* invention, *plastic* invention, or the transformation of the elements furnished by nature, with which the artist composes new images.

On this point alone, M. Souriau diverges widely from the authors who have strenuously endeavored to restrict the rôle of mental activity and creative power in artistic work. In their endeavor to see imagination in the arts only, they have ended by failing to grasp its significance in the other activities of the mind; and they have then passed over to a point of view which is almost diametrically contrary, and they have been in danger of restricting to excess the rôle of this principal faculty of the artist, after having conceded to him the exclusive possession of it.

Predominance having thus been granted to the imagination, M. Souriau has further undertaken to justify the full exercise of it in art, even to the point of exaggerated symbolism for the *representative* imagination, and to the point of completely abandoning the real for the ideal in the *inventive* imagination. This indeed is the real object of his work.

It need scarcely be remarked that by the name of *symbolism* he would have us understand here the resources of expression which the artist seeks in associations, in analogies received or invented, and as variously understood by him. His two chapters on the "Symbolism of Colors" (the correspondence of sensations, sounds and colors, shadings and feelings), and on "Symbolic Figures" (symbolism by typical example, by personification, and by transposition) are the best. He is at pains to exhibit the value and reasons of certain recent efforts of which unfortunately we are in most cases obliged to criticise the temerity or to deplore the lack of success.

As to M. Souriau's doctrine itself, I have already given a char-

acterisation of it. Despite the inevitable divergencies, which sometimes spring solely from the terminology, I am in agreement with him on several cardinal points and upon the general purpose of the whole; although I am less inclined than he to force the artist into the regions of poetry, and I should restrain him far more in pressing his modes of expression.

* * *

The volume of M. M. GRIVEAU, *La sphère de beauté, lois d'évolution, de rythme et d'harmonie dans les phénomènes esthétiques*, contains over 900 pages, and I am unable to give an adequate analysis of it in the space at my disposal. It will be sufficient to point out broadly the very original thesis of the author, which consists in deducing "laws" from a metaphysical classification from the adjectives of language considered as the expression of sensations both as to degree and relationship. I have already described it at some length in Vol. IV. of *The Monist* (page 127), to which the reader is referred. I shall merely recall here the principal result of the method followed by M. Griveau, which is to establish for every sensation, under the name of the law of polarity, a "mean zone," or area of indifference, starting from which the classification extends, diminishing or increasing in quantity in two contrary and complementary directions, and ultimately reaching two extreme stages of pejorative character, between which the "favorable" and "critical" points are situated.

The thesis also involves the following consequences: in the first place, it assumes a sort of relationship or psychological bond of connection between the perceptions of the different senses and the corresponding sensations; in the second place, the laws deduced from the "lexicographical gamut" are, by virtue of this relationship, assumed to be adequate as a foundation for passing judgments on works of art; and finally, there exists, according to this doctrine, so perfect an agreement between our psychological states and external things, that language properly studied will reveal to us a universal law and furnishes with a sound foundation for metaphysical induction.

On the first point, M. Griveau is really interesting; he has

many curious things to say regarding the analogies existing between gamuts of temperatures, colors, musical notes, odors, tastes, and sensations of weight and of contact,—inevitable analogies for the reason that they answer to our unity of organisation, but analogies that have never before found so emphatic and careful expression in language. And it is precisely this in my opinion that is the most interesting part of the work.

As to the second point, I am inclined to think that our judgments of taste cannot always be founded on the theory of "gamuts," and that this theory at least cannot cause us to neglect the other sources of esthetic information. In fact, M. Griveau himself, in asking the classic questions, *Quis? Quid? Ubi? Quibus auxiliis? Cur? Quomodo? Quando?* and under the guise of "circumstances of adaptation," appears to me to redintegrate in his criticism of art the ordinary elements of judgment. In some cases also he has been perhaps under the sway of preconceived ideas which have their source in extrinsic considerations, and I fear that the rules deduced from his principles, if artists should go so far as to adopt them, would seriously hamper their inspiration and the good turns of their imagination.

As to the third point, M. Griveau has many reasons, despite his reservations, for asserting "the perfect conjunction of the physiological laws of being with the laws of physical equilibrium," the necessary "conformity of human nature with external nature (as seen by our minds)." It is true, he tells us, that what is outside of us "in gradation" is presented in us "in opposition"; but the law of polarity, he adds, offers a striking and remarkable identity with the graphic representation of pendulary oscillation; and if everything is ultimately reducible, as he thinks, to the fact of periodocity, then his law of polarity would find universal extension.

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Dr. Paul Hartenberg has approached with success in a volume entitled *Les timides et la timidité* a subject which has already been treated with much skill by M. Dugas. He starts out from the same definition of timidity that M. Dugas also accepts, viz., that timidity is a complex emotion, a mixture of shame and fear,

which is always and only produced in the presence of human beings, and which is distinguished by being altogether unfounded and without an object; or, as it is usually characterised, by being *false* shame and *false* fear. Being an adherent of the theory which gives the emotional life priority over the intellectual, as well as of the consequences of that theory, involved in the thesis of James and of Lange, he does not conceive timidity as being without emotion; for him it is an "objective, organic emotion, manifesting itself exclusively on the occasion of social relations"; and this is why he refuses to speak with M. Dugas of intellectual timidity. Timidity is an emotional phenomenon, he says, "which is not found in the domain of pure thought": in this domain there are timorous, but not timid, people.

Timidity takes on two forms; the one occasional and intermittent, the other chronic; born of diverse circumstances, it becomes, through repetition and its effect on the mind, a form of character. One becomes really timid in proportion as one becomes conscious of one's timidity.

Dr. Hartenberg has made a careful study of two phases of his subject: one which he calls "the attack of timidity," and the other the character of timid people. He has done this by adducing many interesting details and new facts, and by taking from the classical heroes of timidity, such as Amiel, their most instructive confessions. I should accept, with reservation only, the types taken from the novels of the day, where observation is in great danger of being forced in them. For example, I am not certain that the timid type necessarily hates the active and courageous type (Paul Bourget), nor that he is necessarily impelled by his analysis of himself to egotism (Maurice Barrès). On the contrary, an alliance which seems to me constant exists between timidity and pride. Pride is a defensive sentiment, a re-establishment of the internal balance disturbed by our timidity, "a reaction of personality," as our author well says, "against the discomfort which it causes." But this movement of defense does not necessarily go to the extreme of aggression or of hatred.

"The timidity which is associated with vanity or with pride,"

I wrote years ago *à propos* of the letter of the painter, Paul Huet (*Psychology of the Painter*, page 162), "is always at bottom the fear of not rising to the full height of the estimation in which one holds oneself." Timidity is a sort of pathological garb which clothes temperaments of greatly varying types.

Dr. Hartenberg has rightly gone to the pains of pointing out in a special chapter, which is one of the best in the book, the pathological aspect of timidity. Timidity undoubtedly springs from an exaggerated sensibility, which may be regarded as morbid; but how often has it not risen from the existence of some defect which is keenly felt by the individual, from some hidden malformation, etc.? Much remains to be said, in my opinion, on this delicate subject.

As to the therapeutic methods, we cannot exaggerate their value. Of the direct methods, I attribute most importance to the "exercises of muscular attitudes," as the author has described them. The great remedy will, however, always be, as our author has also clearly seen, to mingle much in life, to live much among men. "If it is good for one to have been timid, it is better to have been cured of it and to be so no longer."

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I am ashamed to have to announce so briefly a work of the erudition and importance of M. L. COUTURAT'S *La logique de Leibnitz d'après des documents inédits*. It has often been said that Leibnitz was not properly a mathematician, but rather a philosopher. It would be not less correct to say that he was a philosopher who had the spirit of mathematics, and was the most perfect type of his period, which was so distinguished in the history of philosophy, where metaphysics found its inspiration in mathematics. For Leibnitz every truth is analytical; his logic is deductive; the logician operates with concepts as the algebraist with symbols. M. Couturat shows very clearly that logic occupies the central place in his system; he shows us how Leibnitz was the precursor of modern algebraical logic, and how his genius, which outstripped his times, found itself oppressed by the authority of Aristotle and Euclid, which then overawed all minds.

One of the guiding ideas of Leibnitz was that there existed a perfect agreement between thoughts and things, between nature and mind. A necessary but not arbitrary order was, he thought, discoverable in things, and this order was the objective, although unknown, foundation of the truth. We are at liberty to arrange our symbols as we wish; but the connexion between our symbols must correspond with the real connexions between ideas and subjects; and this independent of our pleasure. Reality, in a word, is penetrable to reason, because it is thoroughly penetrated with reason.

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In this connection, I may mention a pamphlet by M. Pierre Boutroux, *L'imagination et la mathématique selon Descartes*, which constitutes No. 10 of the *Bibliothèque de la Faculté des Lettres de Paris*. M. Boutroux has undertaken this work to determine the function which Descartes attributed to imagination in the mathematical sciences, and also the part which he caused it to play. This question of the imagination is of importance for the reason that it is intimately connected in the thought of the master with that of the relations of the understanding to sensibility, or of the soul to the body. With Descartes as with Leibnitz it is necessary to keep constantly together their mathematical method and the principles of their metaphysics.

In closing, I may be permitted to call attention to a work which would seem to be of much importance, *La philosophie de la nature chez les anciens*, by M. Ch. Huit.[1] It is a work crowned by the Academy, and one of which M. Milhaud, who is deeply versed in this subject, speaks very highly.

Lucien Arréat.

Paris.

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[1] Paris, Fontemoing, publisher.

CRITICISMS AND DISCUSSIONS.

AUGUSTUS WALLER'S EXPERIMENTS IN ELECTRO-PHYSIOLOGY.

[On his last trip to Europe during the Parisian exhibition, the editor visited in London Prof. Augustus Waller, whose work on electrophysiology had attracted his attention in various ways. Prof. Augustus Waller, son of the famous physiologist, possesses a pleasant home in a northern suburb of London to which a comfortable and spacious laboratory, originally built by a former owner of the house as an artist's studio, is attached. It is furnished with all necessary apparatus and wired according to the needs of the experiments, with a suspended table counterpoised from the ceiling, easily removed when no longer needed. Here the professor spends his leisure hours in the company of his congenial wife, the most faithful helpmate in his scientific labors. Professor Waller's investigations are of great importance and by no means limited to his specialty, for he takes also a deep interest in the logical principles of scientific enquiry and has promised to furnish *The Monist* a contribution on that intricate problem.

For the facts stated in the present communication of Augustus Waller's work in electrophysiology the editor is indebted not only to the professor himself but also to his wife who has been most obliging in furnishing the necessary data.—EDITOR.]

"Living nervous matter—all living matter indeed—is 'excitable' and responds to its 'call-from-without' by some form of movement—chemical movement, mechanical movement, electrical movement. An isolated muscle gives sign of life by contracting when stimulated, and we are able by more or less refined methods to show that such contraction is accompanied by physico-chemical changes—production of acid, evolution of carbon-dioxide, rise of temperature, electromotive action. An ordinary nerve, normally connected with its terminal organs, gives sign of life by means of muscle, which by direct or reflex path is set in motion when the nerve-trunk is stimulated. But such nerve separated from its natural termini, isolated from the rest of the organism, gives no sign of life when excited, either in the shape of chemical or of thermic changes, and it is only by means of an electrical change that we can ascertain whether or no it is alive. The eye—the retina—is known to

us as a living organ in our own persons when we see an external object. By various devices of the laboratory we measure quantities of stimulant light and differences of excited sensation. The isolated organ—an entire eyeball, or its isolated retina—is best known to be alive or not by means of its electrical response or silence when it is put to the question by its natural stimulus, light. In these three cases named, the most general and most delicate sign of life is the electrical response."[1]

These words give the keynote to Dr. Waller's work in electrophysiology during the last five years. The electrical response to any sort of excitation gives a remarkably precise indication of the state of any living tissue, e. g., in muscle the decreasing and fatigue curve of mechanical contraction is shown to follow closely parallel with the curve of its electrical response.

Dr. Waller has decided a question of psychological interest by means of the electrical response of the eyeball. It is found generally that equal increments of stimulation produce diminishing increments of sensation (Weber-Fechner curve), and he asks the question: Is this disproportion of physiological or of psychological origin? He divides the process of sensation into three parts: (1) the outside phenomenon which causes it, (2) the internal stimulus, e. g., the change provoked by it in the nervous system (in physiological ground), (3) the sensation itself (in psychological ground), and then asks: does the disproportion take place in physiological or in psychological ground? To solve this problem a study is made of the frog's eyeball in which the effect of a known standard of light can be measured on a galvanometer by the electrical change it causes in the eyeball. The magnitude of stimulation was in this case varied by altering the distance from the retina of a standard candle and recording by photograph, the galvanometric deflexion. The curve obtained on the record resembled the Weber-Fechner curve so that, taking the eyeball as the intermediate physiological ground between the external stimulating phenomena and the psychological ground of the sensation itself—the disproportion is in physiological ground, not in psychological ground.

The electrical condition of substance is most conveniently studied by means of the galvanometer which gives a measure of electromotive force, and for all these investigations Dr. Waller has contrived a simple arrangement of instruments easily modified according to the subject studied. The centre of all the apparatus is a keyboard made up of a straight piece of brass on an ebony stand; to this piece of brass are fixed pairs of brass terminals and between each pair the brass is broken and a brass plug or key inserted. By means of this keyboard the electrical circuit can be controlled; one pair of terminals is attached by wires with a demonstrating galvanometer, another is connected with the animal or vegetable substance to be studied, another is attached to the exciting coil or battery or condenser, a fourth

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1 "On the excitability of nervous matter, with especial reference to the retina." *Brain*, Part I. 1900.

is connected with a resistance box for measuring the electromotive force of the subject studied, a fifth pair may be attached to a recording galvanometer and by means of the keys any of these objects may be brought into the circuit or shut out from it. The recording galvanometer is kept in a dark room, and the movements of its magnet are photographed, the light passes through a fine vertical slit in a box containing a lamp and is focussed on the mirror of the magnet and reflected on to a horizontal slit in a box containing the photographic plate; the dark slide containing the photographic plate is attached to a clock on top of the box which is arranged to allow the plate to descend quickly or slowly behind the horizontal slit. By this method the movements of the galvanometer can be accurately recorded by photography.

Nerve is now admitted to be practically an inexhaustible tissue. Waller showed that its apparent exhaustion in a nerve-muscle preparation is due to the breakdown of the motor-end plate which is the link between nerve and muscle; but a strand of nerve is practically inexhaustible and a series of electrical stimuli will evoke an even series of responses, first noticed and called by DuBois-Reymond, negative variations because negative to the normal current of injury of the nerve; positive variations are also evoked and Waller points out that it is this extreme negative and positive effect, a breaking down and building up process which causes the inexhaustibility of nerve; on account of its stability he chose nerve as a convenient tissue to study under a variety of chemical conditions, and he adopted the following method.

The sciatic nerve of a frog is dissected out, cut at its muscle end, and left attached to a piece of spinal column by which it can be lifted to avoid injuring the nerve. It is placed on four electrodes in a moist chamber having an inlet and outlet for the passage of gases. Two of the electrodes at the distal end of the nerve are unpolarisable, leading off to a galvanometer, the other two placed nearer to the spinal end of the nerve are exciting electrodes from a Berne induction coil. The nerve is excited once a minute and its electrical response is observed on the galvanometer. At each excitation the galvanometer spot (image of a vertical slit in front of a lamp reflected on a scale by the mirror on the swinging magnet of the galvanometer) swings steadily and its movement is photographically recorded on a sensitive plate which descends by clockwork behind a horizontal slit in a dark box. Taking a strand of nerve as representative of living matter, the effects of chloroform, ether, nitrous oxide, and other anæsthetics were tested on it and found to correspond with their known effects on man and animals. The effect of chloroform is shown by driving air for one minute into the nerve chamber through two wash bottles, the first containing chloroform and the second water; the electrical response is finally abolished. The effect of ether was tried in the same way with the result that the response was temporarily abolished. By means of this method, comparison was made between chloroform and other chloromethanes, nitrous oxide and carbonic acid, and the effect of chloroform at different strengths. Chloroform

was carefully compared with ether and found to be seven times more powerful, By diluting chloroform, the effect of different strengths of the drug was observed and the reaction was found to be most exact and delicate. One per cent. vapor caused partial abolition of the negative variation with complete recovery, two per cent. caused greater abolition with recovery, three per cent. and four per cent. gave still greater effect while five per cent. vapor caused profound anæsthesia with bad recovery, and strengths above this caused death of the nerve. These results correspond remarkably with what has been found to be a safe quantity of chloroform to use in anæsthetising the human subject. This part of Dr. Waller's work has an important bearing on a matter of general public interest, "deaths from chloroform."

Carbonic acid gas gave most interesting results: it was found that the negative variation was diminished or altogether stopped during the passage of the gas, afterwards it was greatly augmented. If expired air or dilute carbonic acid gas, was passed over the nerve the responses to electrical excitation were augmented without any primary diminution. These effects of carbonic acid gas were peculiarly interesting because they led to the expectation of finding evidence of chemical action which has never been observed before in nerve although chemical and thermic changes have been observed in muscle. Any activity in living tissue is accompanied with the formation and discharge of carbonic acid; a small amount of carbonic acid—such as is contained e. g. in expired air—causes a marked augmentation of the negative variation. An isolated nerve might act thus as an indicator of the presence of carbonic acid.

Supposing that carbonic acid was formed within the nerve itself during its excitation, one would expect to find that the negative variation was augmented at first and then gradually diminished as the carbonic acid became dissipated. On this hypothesis Dr. Waller forecast in a diagram on the black-board the kind of tracing that he expected to obtain in the photographic record of the actual experiment. The diagram represented the normal series of equal steady responses to electrical excitation lasting one eighth of a minute at one minute interval, then a descending line during five minutes tetanus and afterwards the series of one minute stimuli augmented in value and then diminishing. The experiment was started and recorded and the development of the photographic record awaited with intense interest. The result was exactly as expected: the photograph came out similar to the diagram and showed evidence of chemical action in nerve, an evolution of carbonic acid which acted in the substance of the nerve just as slight amounts of the gas act on it when the nerve is lying in an atmosphere of dilute carbonic acid.

The record of a series of responses to stimuli in nerve nearly always shows a staircase effect, i. e., each response slightly exceeds its predecessor; this is also due to the stimulating effect of a slight amount of carbonic acid produced at each electrical stimulus. Carbonic acid has an anæsthetic effect on the normal beat of a frog's heart.

Dr. Waller's method has also yielded valuable results in showing the potency of various drugs and determining what part of a salt is the active factor; by what group of atoms it acts; as for instance in comparing the potassium and sodium salts and the chloride, bromide and iodide of potassium, potassium is the active element, not the chloride or bromide and a potassium salt is far more powerful than a sodium salt. There is a great similarity between the action of aconitine and acetic acid pointing to the probability that aconitine acts by virtue of an acetyl group.

From observing the effects of anæsthetics upon animal tissue Dr. Waller proceeded to consider their effect on vegetable protoplasm, and in conjunction with Professor Farmer he compared the influence of chloroform, ether and carbonic acid simultaneously on the mobility of nerve judged by its negative variation, while the movement in vegetable protoplasm was measured by the rate of circulation of the chlorophyll bodies. Elodea and chara were chosen for this purpose because of their simple structure; in their cells the chlorophyll bodies circulate round in a processional manner and the rate of movement can be measured under the microscope by counting the number of bodies passing per minute under a cobweb placed in the eye-piece. Carbonic acid gas passed through the little chamber containing the plant, and through the nerve chamber, caused stoppage of the circulation and stoppage of the negative variation; on aerating the two chambers the chlorophyll corpuscles began to move fitfully, then more rapidly than usual and afterwards resumed their normal rate; simultaneously the nerve gave increased negative variations and afterwards a normal series. Ether vapor arrested the circulation temporarily and chloroform abolished movement permanently unless a very weak vapor of two per cent. in air were used when a temporary arrest was caused, thus corresponding remarkably with the strength which Dr. Waller has shown to be safe in the case of the human subject.

In considering the immense influence of light in causing chemical and electrical changes, Dr. Waller tried the effect of light on green leaves to see if light causes any perceptible electrical change and he found such to be the case. The experiment is a most elegant one: the leaf of an iris, laid on a glass plate and partly shaded with black paper, was enclosed in a dark box fitted with a small shutter that can be opened to allow light (either the arc light or sunlight) to fall upon the uncovered part of the leaf on which unpolarisable electrodes are placed leading to a galvanometer, a deflexion of the galvanometer magnet occurs beginning and ending sharply with the beginning and end of illumination and amounting sometimes to ·02 of a volt.

During observations on the frog's eyeball Dr. Waller noticed that as an after-effect of any excitation, induction shock or condenser discharge, an electrical current was invariably obtained from the fundus to cornea. This current he called the blaze current; it does not occur in a dead eyeball and he subsequently found that blaze currents are characteristic of living matter and can be utilised as a sign

of vitality. After testing various tissues, animal and vegetable, Dr. Waller made a closer study of blaze currents on beans. On uninjured beans the blaze current is in the same direction as the exciting current. The bean to be tested is placed between two unpolarisable electrodes; after compensating any accidental current which the bean may exhibit so that on plugging and unplugging the galvanometer no movement of the zero is visible, the galvanometer is plugged, the bean is submitted to an induction current or a condenser discharge for a short period, five seconds, the galvanometer is then unplugged and the after-effect observed. On an uninjured bean the after-effect or blaze is invariably in the same direction as the excitation. It lasts a considerable time, five to fifteen minutes and can be described as being a local explosive change in the living matter. In an injured bean the blaze occurs only in the direction from uninjured to injured surface to either direction of excitation but is distinguished from polarisation counter current by its much greater magnitude and duration. A boiled bean gives no blaze current in either direction but only small polarisation counter currents.

Anæsthetics were tested on the blaze currents. To obtain temporary suppression of the blaze currents it was found necessary to choose a sufficient but not too strong exciting current and to anæsthetise rather by ether than by chloroform. Comparison was made between fresh seeds and the same seeds killed by boiling. Fresh seeds giving blaze currents of ·01 to ·10 of a volt give no blaze currents after boiling but only polarisation counter currents of ·0005 to ·0020 of a volt. Peas, beans, cherry-kernels, plums and peaches were tested in this way.

A series of experiments were made on beans of certificated years in order to show the deterioration of seeds with age. Beans were obtained dating for ten years back and were compared by the blaze test and the germination test, the proceeding was as follows: the dried beans are soaked in water for twelve hours, then placed in an incubator; the next day each bean was peeled and its radicle carefully broken off and placed between unpolarisable clay electrodes—a current of injury is observed from the broken base to the apex and a blaze current from apex to base in response to both directions of excitation. By testing the radicles prepared in this way, more uniform results were obtained than by taking the entire bean with possible unknown local bruises.

In comparing ten beans of 1899 with ten beans of 1860 the average blaze and germination test of the 1860 gave no per cent. whereas the average blaze of 1899 gave ·037 of a volt and the germination was one hundred per cent.

An interesting comparison was made between the blaze current of beans taken for five years from 1895 to 1899. The average blaze of the 1895 beans was ·0014 of a volt; of 1896, ·0036 of a volt; of 1897, ·0043 of a volt; of 1988, ·0052 of a volt; and of 1899, ·0170; showing how the vitality and consequent germinating power diminish with the age of the seed.

Series of germinations were carried out parallel with the blaze tests and it was found in every instance that those which gave no blaze also failed to germinate.

PROF. ROYCE'S REFUTATION OF REALISM AND PLURALISM.

Professor Royce's recent book, *The World and the Individual* (*First Series*), is without doubt one of the most substantial of contemporary contributions to philosophy. The work is avowedly devoted to a systematic consideration of the central problems of metaphysics and epistemology. It proposes, moreover, not only to be comprehensive and fundamental, but irresistible in its logical force. The author's claim for the "absolute logical necessity" of his conception of being (*The World and the Individual*, p. 349) will naturally be accepted as a challenge by any one who ventures to dissent. I undertake in this discussion to evade this same logical necessity by proposing certain miscellaneous criticisms, first of Professor Royce's general method, and secondly of his systematic refutation of realism and pluralism.

A critic approaches Professor Royce's dialectic with some timidity in view of his preparedness for a very aggressive sort of defence. There are three doors which invite the entrance of the dissenter; No. 1, labelled "Realism"; No. 2, labelled "Mysticism"; No. 3, labelled "Critical Rationalism." If you enter any one of the three, "Absolute Logical Necessity" is there waiting for you; and, after being vigorously assaulted, you are led in a dazed condition directly into No. 4, which is the proper abiding place of this monster, and is called "Constructive Idealism." The critic's only hope of safety is to linger outside, and bombard the whole fortification with masked batteries.

Professor Royce's treatment of ultimate problems is essentially epistemological. His classification and criticism of metaphysical theories, as well as his own constructive argument, are based upon a consideration of the ways in which reality presents itself as an object of thought. He is "one of those who hold that when you ask the question: What is an Idea? and: How can Ideas stand in any true relation to Reality? you attack the world-knot in the way that promises most for the untying of its meshes" (*ibid.*, pp. 16, 17). Realism he finds to be a metaphysical theory defining the real as that which is independent of ideas. Mysticism is a definition of the real as that which satisfies ideas by substituting an irrational immediacy. For "Critical Rationalism," the real is empirically verifiable truth. Finally, the author himself finds that to be real which "presents in a completed experience the whole meaning of a System of Ideas" (*ibid.*, p. 61). These definitions show not only that Professor Royce's method is that of reflection upon thought, philosophy's self-criticism, but that the real end of the discussion is a logical one. Although he announces as his central problem, "What is Reality?" (*ibid.*, p. 6), it soon becomes evident that he is not seeking to discover what is real, so much as what it is to be real. In short, it is the conception of being that he is concerned with first and last. The object of study is the intension rather than the extension of that term. This it seems to me is an essentially fruitless metaphysical

method, which found its *reductio ad absurdum* as long ago as the time of Parmenides. Its essential fruitlessness follows from the fact that it is untrue to the original philosophical consciousness. Philosophy is begotten by the desire to know more about a certain definite world that is already evident in part. The philosopher is desirous not of creating but of enlarging knowledge. He would never seek after reality if he had not already found it. The proper philosophical motive is not the self-conscious pursuit after the inner meaning of unconscious utterances, but the desire to know more and better the world that is continuous with the thinker's practical life. The philosophical spirit does not direct a man from the study of real things to the study of the adjective "real," but to a study of more real things in the hope that he may compass all things in some thoughtful belief. He has no need of defining the predicate of existence, nor is this a part of his search; for he is already familiar with that predicate before he can conceive the philosophical problem. I believe that it is only by being true to the original healthy philosophical impulse, that our results will be sane and enduring.

But the fallacy of making the idea of being the object of our reflection, is more directly evident in the fact that such reflection can never reach a definition of its object. A definition that contains the term to be defined, is, of course, no definition at all; and every definition must contain the existential predicate. As Professor Royce himself assures us, every universal proposition cancels certain particular beings; and in so doing it must employ the idea of being. The existential predicate cannot, therefore, be defined; and it very properly does not occur to the ordinary mind to attempt to define it. The man who first enters upon philosophical reflection is already familiar with a great many real things of various kinds. Some of these fulfill his desires, others thwart them; some appear to be independent of his will, some dependent; for some he has appropriate ideas and meanings, others appear only in immediacy, and can be represented only symbolically. But he calls them all "things," or "facts," and they already have about them one common aspect which he recognises implicitly in the crudest activities of his consciousness. As our human being proceeds with his reflection he continues to assume this predicate. His aim is to enlarge, and possibly to unify his experience; that is, to find more real things, or to find certain latent similarities in those he has already observed. His problem is best expressed by the question: What is all reality *like*? Is it composed of many ingredients after the manner of his present experience? Is it reducible to some one of those ingredients? Or is it all composed of some neutral element analogous to certain of those ingredients? He is interested in the composition of the real, and not in reality as an hypostasised aspect of his experience. The true classification of philosophical theory will be that which states the different answers to this objective inquiry. Realism, Mysticism, Critical Rationalism, even Constructive Idealism may be so defined, and made to assume the form of hypotheses about the composition of this world—a world whose reality is accepted in the beginning as an aspect of the preliminary experience of

each thinker. By such definitions Professor Royce would not only have used the first three of these titles in a manner more acceptable to their several proprietors, but would have given his own doctrine greater vitality and concreteness. He has abstracted in the case of each of these historical doctrines the conception of the relation of the real to consciousness, and defined the doctrine in terms of it. But independence, fulfillment and validity are supposed by realists, mystics and critical rationalists respectively, to inhere in a being that is given, and that possesses a rich qualitative character apart from this specific aspect. This aspect is not defined as constituting the existential predicate, but as being part of a whole existence and sharing the existential predicate with the remainder. The mystic, e. g., in asserting that the real fulfils thought by substituting an irrational immediacy, would not mean that this aspect of the real is synonymous with its reality as such. The *immediacy* is the real, and its reality-aspect is its *givenness*, its *actuality in experience*. The claim of this immediacy to be a synthetic and all-comprehensive reality rests upon the supposition that in a certain unique experience you may see all reality to be so encompassed. The normal human experience lacks not actuality, but completeness and unity. "The real fulfills," and "reality is fulfilment," are not convertible expressions. Herein is a subtle ambiguity that is constantly threatening Professor Royce's discussion. The ambiguity is due to the substitution of a psychological account of the philosophical activity for that activity itself. "My intellect desires the real." "The real, therefore," says Professor Royce, "is the object of your intellect's desire." Now the real which your intellect desires, and the real defined entirely in terms of that desiring, cannot be the same. The desiring cannot be without an object other than its own desiring. The intellectual inquiry assumes the possibility of an answer, and that answer cannot be a repetition of the question itself. If thought is to be a quest at all, it must be in quest of something other than its own quest; otherwise a man may lift himself by his bootstraps. That of which it is in quest, it already assumes to be something, to be a given fact; otherwise it could not figure as an object of thought. So it means nothing to define being as fulfilment, or say that to be means to fulfil. That which is, must *be* in order to fulfil; and its being is implied in its fulfilment, and cannot be identical therewith.

In consideration of these facts, it seems to me that we are safe in standing by the common-sense assertion that being is an irrational term, contained as an aspect of the first experience, and connoting nothing but synonyms. Moreover I believe that it is fair to say that Professor Royce, in other parts of his own discussion, not only recognises this ultimate fact-aspect of things, but makes a very generous use of it. This same irrational, so impossible at a time when logic and epistemology are in control, is nevertheless called upon to assume the very dignified rôles of Will and Freedom. But for the present let us turn to an examination of our author's criticism of realism. Our discussion up to this point has already precipitated the issue, since realism is primarily an outgrowth of that common-sense reference to

an irrational factor in reality which we have already defended. Professor Royce's account of the matter is of great importance, not only for the sweeping character of its criticism, but for the part which it plays in preparing the way for his constructive argument. He so orders his dialectic as to involve pluralism in the same logical ruin that befalls the realism of his own defining, and the Absolute is already in sight when this encounter is over.

Since Professor Royce has himself defined the realism which is the opponent of his dialectic, it behooves us to discover whether that opponent is so truly representative as to make the battle one of genuine strategic importance. There is to be noted, in the first place, a very serious ambiguity, arising from the author's failure in the early part of the discussion to specify his use of the term knowledge. Realism, he announces (*ibid.*, page 66), "asserts that . . . independence of your knowing processes, and *of all such knowing processes*, as is your seeing, i. e., of all actual or possible external knowing processes whatever, is not only a universal character of real objects, but also constitutes the very definition of the reality of the known object itself, so that to be, is to be such that an external knower's knowledge, whether it occurs or does not occur, can make no difference, as mere knowledge, to the inner reality of the known object." Elsewhere (*ibid.*, p. 100) Professor Royce illustrates his definition by reference to Locke, and accepts as typically realistic the latter's account of his Primary Qualities: "The particular bulk, number, etc., of the parts of fire, or snow, are really in them, *whether any one's senses perceive them or no.*" So far it would seem that he means by realism the proposition that reality is essentially independence of any form of consciousness. Such a definition, however, represents neither common sense nor any historical type of philosophy. Even materialism, which it approaches most closely, has invariably selected as the essence of reality some definite substance, such as the water of Thales, and the ether of some contemporary "Monists"; or certain spatial predicates, as in the case of the more refined materialism that has issued from Galileo and Descartes. Materialism is a positive ontology, and not a negative epistemology. Nor has common sense ever regarded as essentially real that which might exist apart from consciousness. Common sense has always posited the reality of conscious beings, together with the subjective content of their minds, and has recognised consciousness as in this case identical with existence itself.

But Professor Royce, in a later passage (*ibid.*, p. 96), gives to realism a very much more liberal interpretation. "One could be a realist in his definition of Being," he says, "and still insist that all Being is in its nature entirely psychological." He intimates his doubt as to the possibility of consistently working out such a theory, suggesting the difficulty of dealing with certain relations; but realism evidently no longer means the definition of reality as independence of consciousness. Schopenhauer, with his conception of will, and Berkeley, with his spirits, would be realists in so far as they conceived it to be impossible adequately to represent these entities in idea; and one would be liable to a similar charge who

maintained that, e. g., *A*'s selfhood was indifferent to *B*'s thought about it. Professor Royce now explains his definition as follows: "You, for instance, as a conscious mind, might be viewed by a realist as a being that he would call real in his sense. That assertion, if made by a typical realist, would simply mean that the contents of your mind, although present within your own consciousness, are real without regard to whether anybody else knows of your existence or not." (*Ibid.*, p. 96.) Realism now means that it is of the essence of reality to be independent of such representative ideas as may be referred to it. The entity may be an object of experience. If so, there is a primary order of experience in which it is real, and which is to be contrasted with a secondary order of ideas, having a purely symbolic and representative value. The real may be essentially irrational, or accidentally irrational, i. e., capable of being rationalised; but its being is in no sense derived from ideas.

This conception of realism corresponds more nearly with common sense, in so far as there can be said to be any utterance of that authority in this particular matter. Common people are not epistemologists, and realism is an epistemological theory. Hence it is doubtful whether there is any such thing as the "naïve realism" so commonly referred to. But there are certain general practical postulates which are capable of a realistic interpretation. The common man assumes that things, for the most part, "stay put," i. e., may be depended upon to endure for some period of time. At any rate they are regardless of his will, unless he can bring other things to bear upon them. He must reconcile himself to them, even if he is to change them. They are what they are, for better or for worse. He is liable to respect the independent reality of other human beings in proportion as they exhibit a similar indifference to his will. This same presumption applies in the case of his *thought* about things. He imagines what they may be, names them, defines them, asks about them, constantly taking for granted that if any discrepancy between them and his thoughts is revealed, *he* must give way. The facts are stolidly indifferent to his gropings, and unsympathetically "stare him in the face," when he finds them. The term "fact" signifies more of reality for the common mind than any other popular quasi-epistemological expression, and as ordinarily employed it stands for the givenness of the real. We have it "on our hands." Possibly the tacit realism of every-day life might be summed up by the saying: "It is a *situation* and not a theory that confronts us." Or, as Professor Royce well says in another connection, "Necessity comes home to us men through the medium of a given fact" (*ibid.*, p. 257).

We may now state a definition of realism that seems to me to be representative of both philosophical realism and common sense; and to be the most consistent statement possible of what Professor Royce has named realism in his account. The realist believes reality to be a *datum, a somewhat that is given independently of whatever ideas may be formed about it.* According to the realist, the real has a *locus*, a *habitat*, whether or no within some individual experience.

Here the real primarily *is*, and is, regardless of whatever secondary meanings, symbols, names, relations, or ideas of any kind may be referred to it. The realist conceives of a *thing*, and *thought about that thing*. They are two orders, not necessarily two kinds; for the thing may be a thought. But in every case the thing of the first order is indifferent, as far as its being is concerned, to the thought of the second order; which may reveal, but does not constitute or create its object. Realism being so defined, has Professor Royce succeeded in overthrowing it?

The first step in his argument is to inoculate realism with pluralism. It should be evident from what has been said, that the realist has in mind a very definite relation between the idea and its object. The real may be found or interpreted by ideas, which are nevertheless adventitious as respects its being. The idea, on the other hand, is strictly dependent upon the reality, being derived therefrom, pointing thereto, and tested thereby. This relation may present difficulties, but the realist means it, and would never recognise as descriptive of himself, Professor Royce's statement of the *absolute mutual separateness* of idea and object. Nevertheless our author argues that this mutual independence is the logical outcome of the realist's position as stated above. Let us examine the argument.

In the first place, as we have seen, realism defines the real object *o* so as to be independent of the idea of *o*. One may suppose the idea of *o* to vary or to vanish; and there is no relation between the two such as to compel a corresponding change in *o*. But the idea of *o* is itself a real object, and upon the realistic basis must therefore be similarly independent of—what? Professor Royce says, of *o* (*ibid.*, pp. 265, 266); but this is obviously fallacious. The realist would contend that the *idea of o*, as a psychological entity, was independent, not of *o*, but of another idea, the idea of *idea of o*. So this proves no reciprocal independence.

But in another connection, we are told that, "The idea will have to be, in its own separate essence, independent of the object. Otherwise, by merely examining the idea, taken by itself, you could prove something about the existence of its object" (*ibid*, p. 119). The contention is, supposedly, that if the idea were in every case in some way related to an object, the presence of the idea would be a sure indication of the reality of its object; and the being of the object would so be logically dependent upon the existence of its idea, which, according to our author, would contradict the realistic hypothesis. Now how far is this argument really cogent? Let us suppose the idea to be in every case dependent upon an object. Consider any cognitive idea, e. g. the idea *o*, where by hypothesis the idea is derived from *o*. The idea has a certain content, *o'*, and a certain objective reference. *o'* may be attributed to reality in general, or in particular. If to reality in general, then its object, *reality in general*, is, it is true, deducible from it; i. e., finding the idea of *o*, you may be sure of reality in general. Or the idea of *o* may attribute *o'* to reality in particular. In this case reality in some particular is deducible from the presence of the idea of *o*; i. e. the specific locus to which *o* is attributed, may be assumed to exist. That locus is defined by its context, and the experienced self

of the moment is a part of that context. But has the realist's original position meanwhile been abandoned? Has reality become dependent upon idea, when reality in general, or a certain direction from the experienced self of the moment, is made a certainty by the presence of an idea? We may apply Professor Royce's own test. Under the circumstances described, no change in *o* need follow from a change or the disappearance of the idea of *o*. Two kinds of change may be considered, (1) eternal, and (2) temporal. (1) Omit the idea of *o* from the universe, and only my deduction of *o* is impaired, since, by hypothesis, the idea of *o* was originally derived from *o*, and not *o* from its idea. (2) Cause the idea of *o* to vary or disappear in time, and *o* does not necessarily change; for *o* need not be sensitive thereto any more than a body to its shadow. On the other hand the annihilation of *o* will inevitably affect its object. (1) Omit *o* from the universe, and you destroy the idea, since the idea was by hypothesis derived therefrom. (2) Cause *o* to disappear in time, and you destroy the idea, since you destroy the self, from which *o* was defined as a direction. *o* may, however, *change* without a concomitant variation of the idea of *o*; or the idea may have inaccurately represented *o* from the beginning. These will be the cases of erroneous ideas, to which our author refers. Such have an objective point of reference, to which they ascribe a content that does not correspond to the actual experienced content. Thus it is possible to state the realistic hypothesis in such a way as to involve the relation of an idea to its object without vitiating the independence of the object; or, so as to specify that the object shall be independent of its idea, without implying a similar independence on the part of the idea. The importance of this analysis consists in its defense of realism against Professor Royce's imputation of abstract pluralism. The realist means a certain definite kind of relation between idea and object. The most important step in Professor Royce's dialectic is the reduction of that relation to absolute mutual aloofness. The writer finds no other proof to warrant this step than that which has been examined above. For the sake of clarifying the issue let us formulate as representative examples as possible, to express the realistic position at this stage of the discussion:

1. An idea of the State House in Boston. My idea has a content derived from actual experience, and consisting mainly in visual memories. I attribute this content to a certain locus in human experience. That locus is defined by spatial and temporal direction from my present moment of experience, and by contiguity with other remembered and imagined moments of experience. My idea may refer to the past state of its object, in which case I judge that were I to retrace my own experience back from the present moment, I should meet with a definite fulfilled expectation. In this case my idea is incorrect in so far as such expectation would be thwarted. The degree of surprise would indicate the degree of error. On the other hand, my idea may refer to the present condition of the State House. In this case, I judge that were I now standing in a certain place in Boston, I would not be at a loss, but would recognise my surroundings. Meanwhile the State House

may have been burned to the ground, in which case my error would consist in the hypothetical defeat of expectation, the failure of my present mental content to be such as to prepare me for the actual experience to which I refer. My idea, it is seen, has been derived from the actually experienced object, and is not possible in a universe without the individual State House in Boston. Were the object to become in time absolutely nothing, my self and my idea must disappear with it. For the object as referred to is a direction from the self; and one direction cannot be lost without the loss of all direction, or that orientation upon which self-conscious existence depends. Nevertheless the State House may have burned down without my ever knowing it; i. e. a relative change of content may have taken place, and have falsified my idea without at the same time changing it. On the other hand, the main realistic contention holds, since the waxing and waning of my idea has no effect upon the Boston State House, and a universe without my idea might still be a universe containing the Boston State House.

2. The realist's idea of the world. Professor Royce has used this same illustration in connection with the specious argument cited above. He maintains that since the realistic ideas of the world are real objects, they must be as regardless of the real world as the real world is of them (*ibid.*, pp. 135, 136). But it is perfectly possible for the realist to hold that his philosophy, though as content of his conscious life it is independent of what ideas others may form about it, is nevertheless as idea entirely derived from the actual world of experience. The realist's philosophy will consist in a set of ideas referred by him to the totality of experience. Their truth will mean their power to prepare their thinker for an experience indefinitely enlarged or prolonged. They will be erroneous in so far as they are baffled when confronted by experience, or in so far as such a perplexity is possible.

In such terms as these the realistic position may be stated without involving it in an absurd and self-contradictory statement of the absolute mutual independence of idea and object. Such a mutual independence once admitted, it is very easy, as Professor Royce does, to show that it prevents the idea from being an idea at all, since it could not refer to an object, or to the standards of truth and error.

Though we decline to assent to Professor Royce's reduction of realism to abstract pluralism, the next stage in the argument must be examined in the interests of pluralism itself. Assuming that he has reduced realism to a statement of the absolute mutual separation of idea and object, he considers such independence of many beings as representative of pluralism, and proceeds to attack that general thesis. At the outset let me enter a general demurrer to the way in which our author conducts his case. In the main he takes for granted that the burden of proof lies with the pluralist, and demands of him that he shall *prove* the existence of many absolutely separate beings. Now the pluralist, having empirical predilections, very properly refuses to make any such effort. He is concerned neither with abstract separateness, as the monist defines it for him, nor with proof, as the

rationalist defines it for him. He has found the world to be many. He has encountered, e. g., other selves, many of whom think quite differently, and all of whom feel quite differently, from himself. Such selves are not absolutely separate; on the contrary their community is the very source of their mutual discovery. He alleges that there is in the world just so much unity, and so much difference, as there seems to be. His proof of it is the seeing of it. Professor Royce, on the other hand, admits by the whole character of his discussion, that he is undertaking to demonstrate; and that he is undertaking to demonstrate the necessary reality of a transcendental unity. The burden of proof lies fairly and squarely with the transcendentalist. The importance of this demurrer is twofold. In the first place, it makes plain the futility of setting up for controversial purposes an absolute pluralism, which no other than a transcendentalist could ever have conceived, and the destruction of which injures nothing so much as the prestige of his own method. In the second place this general objection will very largely destroy the cogency of our author's specific arguments, of which we may consider three.

1. Applying first the empirical test, Professor Royce challenges the pluralist to find in the world any cases of objects that are mutually independent. For some reason he weakens his defiance by limiting such objects to "any two physically real objects which are so independent of each other that no change in one of them need correspond to any change of the other" (*ibid.*, p. 125). As respects "physically real objects," one will readily admit that in defining them so, Professor Royce has already precluded the sort of independence he assigns to pluralism. It is ridiculous to demand of the pluralist that he find two objects so independent, that he cannot imagine one to influence the other; and it is more ridiculous to posit that such objects shall be assumed to be "physical," i. e., already defined as in space together. The pluralist would naturally reply that, as Professor Royce allows, he is not concerned in this particular argument with hypothetical possibilities, but with what he *finds* to be the case. He finds physical objects that, so far as he knows, do not influence one another. The actual variations of the one, as far as experience informs him, effect no concomitant variations in the other. More notable for their indifference to one another are the feelings and ideas of different subjects. In innumerable cases, *A's* idea x has been correct or incorrect, has come into existence or ceased to be, with no effect upon *B's* idea y; at least such is the testimony of experience. And we can conceive that in our world such objects should be eternally independent of one another, so that the changes of one should never in any way affect the other.

To be sure, we cannot conceive two objects to be so related that we cannot *conceive* them not to be so related. In the case of the independent objects that we experience or imagine, there will always be for our knowledge the possibility of a change to a relation of dependence. I can imagine a and b to be so sundered that no variation of one as a matter of fact ever effects the other. But I cannot describe that independence so as to preclude for my imagination the possibility of some

event that may bring a and b into a relation of dependence. And here Professor Royce would contend that this theoretical possibility of interaction, is itself a bond of union. Given a and b, admit that though at present variations of one do not affect the other, they may conceivably come into such a relation of mutual affectibility; and you have already destroyed their independence. But why so? On the contrary, you have merely expressed your inability to state that a and b may not at some time change their relation. That possibility, which Professor Royce holds to be a part of the being of a and b, is merely a confession of one's ignorance as respects what the future, or the entire universe, may contain; and by the realistic hypothesis, this does not necessarily concern the objects.

There is great danger of confusing the contention just stated with what is distinctly another logical issue. "Possibility of definition," and "definition of a possibility," are obviously very different propositions. To be unable to define a and b so as to prevent their theoretical modification to a relation of dependence, is not the same as to define a and b as actually capable of entering into such a relation. So we have not yet raised the question as to whether a and b could be actually independent, and at the same time potentially dependent. This question of the possibility of change from independence to dependence is specifically discussed in the next stage of Professor Royce's argument. But up to this point the pluralist may insist that he finds objects which do not actually affect one another in their present observed changes, and that he can conceive the possibility of the permanent or eternal separateness of such. The burden of proof surely lies with those who deny the actuality or the possibility of such objects. For experience, though it testifies to the connectedness of much of reality, testifies to no ultimate all-comprehensive unity.

2. "Assuming the real world . . . . to contain many mutually independent beings," says Professor Royce, "I will prove" that "the many different real beings once thus defined can never come to acquire or later to be conceived as possessing any possible real linkages or connections, binding these different beings together; and so these beings will remain forever wholly sundered, as if in different worlds" (*ibid.*, p. 127). Assume a and b, so defined that one might remain unchanged if the other vanished. Could they ever become so related as to be in any way dependent upon one another? Such a change would involve the entrance into the world of a new fact, e. g., *a influencing b*. Can this fact come to be, and yet be purely adventitious as respects a and b? Professor Royce argues that if the new fact were purely adventitious it could not constitute a link. The argument is much clearer if we reverse the order. Suppose a to be influencing b; then a and b could never have been indifferent to one another's existence. For had a at any previous time disappeared, the event, *influenced by a*," would have been eliminated from the future of b. In other words, if you define an object b so as to affirm that it sometime will be changed by another object a, you have already defined b as affect-

ible by a, and so not independent of it. In this sense, once dependent, always dependent.

So far I admit the cogency of the argument. But the real value of the conclusion is determined by other considerations. In the first place, as has been remarked, the pluralist is not necessarily concerned with the reality of objects that are not in any way subject to alteration by one another. There may still be such independence of origin and such independence of being as refuses to be embraced in any closer unity. Again, the pluralist is not necessarily concerned that the absolutely independent objects, if there be such, should ever become dependent. Finally, he will still deny the validity of the more extreme pretensions of our author's argument. For Professor Royce has undertaken to prove that such independent beings as make no difference to one another can never acquire *any sort of relation*, but must remain "wholly sundered, as if in different worlds." This conclusion would follow from the above argument only in case we assumed that all relations involve dependence; and such is by no means either proven or self-evident so far in our discussion.

Let us suppose, e. g., that a and b are thought together by a finite consciousness M, so as to give rise to the new psychical fact, the idea $a'b'$. They might still have been once so independent of one another that the vanishing of one would not affect the other. The non-being of a would have made $a'b'$ impossible, but that would make no necessary difference to b. For by the realistic presupposition, b is indifferent to $a'b'$, i. e., to thought about it. What b is and what b becomes, is by no means necessarily altered by what may be imputed to it of relation to other objects. To one who objects that we have not linked a and b but only their ideas, it is sufficient to reply that they are at any rate in the same world of thought and possible experience, and that they have obtained some sort of connection that they did not originally have. But Professor Royce might still reply that a and b defined as independent, could possess no such resemblance as that which would be necessary in order to make their comprehension in one thought possible. This is the substance of his third criticism of the "independent beings."

3. "The many real beings thus defined can have no common characters; they are wholly different from one another" (*ibid.*, p. 127). Suppose two objects a and b to possess a common quality Q. Could they at the same time be defined as independent in the sense that one could vanish without affecting the other? Professor Royce replies in the negative, alleging that if a were to vanish with Q in its possession, b would necessarily lose Q, and so change. Or, to state it differently, if a were to vanish with Q, and b were to persist with Q', Q and Q' could not be the same. The proposition is simple enough upon the supposition that for the realist similarity involves identity. Common sense would without hesitation attribute any quality such as Q to quite separate objects such as a and b. But even common sense would not conceive of Q as an identical entity leading a double life. On the contrary, similarity is commonly regarded as dependent upon the judgment of

a synthetic consciousness. One *finds* a resembling b in some particular, Q. In turning from a to b one experiences recognition as respects one part of the content of b. Now cannot a and b be independent, and yet similar in this sense? As has already been maintained, togetherness in consciousness may be adventitious as respects the being of the objects so experienced. Then it is no part necessarily of the being of a that it should be found to be like b, or different from the indefinite number of other objects with which conceivably it might be compared.

But would not the very possibility of such comparison indicate some sameness or community of character as already present? If a and b can be thought together must they not already be alike in that they are members of the same spiritual universe? Or, supposing finite consciousness M to compare a and b, were a and b not previously alike in that each was capable of becoming a part of M? We must reply in the affirmative, and would seem to be compelled to resort to some other comparing consciousness, which if it were not an eternal and all-embracing consciousness, would refer us in turn to another and so on *ad infinitum*. It must be admitted, then, that Professor Royce is upon us with his Absolute unless we can define similarity apart from actual joint presence in consciousness. And this issue is of the greatest strategic importance, because it involves the fundamental epistemological argument which is elaborated in the later portions of the book. It is there maintained that an idea can have an object, and be true or false, only when the intention of the idea is noted by a consciousness that embraces the totality of the world, and can observe the degree to which the idea attains its end. Must the fact of truth or error, or the fact of similarity, be contained in one individual synthetic consciousness?

The pluralist will reply finally, that it is perfectly legitimate to define sameness in terms of possible experience. Suppose a and b to be alike in the particular Q_1 when compared in the consciousness M. Before this observed relation there was that which made it possible; a in itself possessed a definite character; and b in itself a definite character. Whoever experienced a, experienced Q_1; whoever experienced b, experienced Q_2. The sameness of Q_1 and Q_2 consisted in the fact that should a and b be compared, just this likeness Q, might be noted. Moreover this fact of sameness was not a *mere* possibility of experience, but existed in the experienced content of a and b severally. When a and b are actually compared, there is, to be sure, in Q a new fact of *observed* sameness. But such new facts cannot be explained away on any hypothesis. That finite individual M should come to see the resemblance between a and b denotes a new fact in the universe; a fact previously contained potentially in the separate elements here synthesised.

Similarly, one may contend that the truth or falsity of an idea can be construed as the hypothetical fulfilment or defeat of expectation. Subject M, holding idea x of reality, is mentally so constituted that were he to experience the content of that locus which his judgment designates as direction from himself, he would experience some degree of surprise or recognition.

A far more careful examination of the query, "What is truth?" as well as an examination of the problem of individuality, would be necessary before Professor Royce's challenge could be adequately answered. We have considered his refutation of realism and pluralism, in so far as it is nominally concerned with these theories. Thus considered, the argument is a fragment, since, according to our author's plan of campaign, realism and pluralism are to appear again as "almost persuaded," under the title of "Critical Rationalism." But it must suffice to express the belief that the general line of defence here projected could be maintained to the end.

I hope that these arguments may remind some who are of an empirical turn of mind that the great critical epistemology of *a priori* idealism is as yet unanswered; and at the same time suggest that it is not unanswerable. The writer of them arrogates to himself no little virtue for having turned from the tempting ethical and metaphysical quarry contained in this volume of transcendentalism, to an attentive examination of its proof.

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BOOK REVIEWS.

LEIBNIZ'S DISCOURSE ON METAPHYSICS, CORRESPONDENCE WITH ARNAULD, AND MONADOLOGY. With Introduction by *Paul Janet*. Translated by *Dr. G. K. Montgomery*. Chicago: The Open Court Pub. Co.; London: Kegan Paul, Trench, Trübner & Co. 1902. Pp., xxi, 272. Price, 35 cents (2s.).

What a marvellously gifted man Leibniz was! The king of Prussia truly said of him, "He represents in himself a whole Academy;" and George I. of England was quite justified in saying, "I count myself happy in possessing two kingdoms, in one of which I have the honor of reckoning a Leibniz, and in the other a Newton, among my subjects." A brilliant mathematician, contesting with Newton the honor of discovering the Calculus; a gifted psychologist and epistemologist, equalling and surpassing, in his *New Essays*, Locke's famous *Essay*; a profound theologian, writing the most famous book on *Theodicy* which has ever been printed; a learned historian, producing a history of the House of Brunswick commended by Gibbon himself; a far-sighted statesman and diplomatist, honored at several of the most powerful courts of Europe; a great philosopher, founder of modern German speculative philosophy and worthy to be named with Kant himself; and, withal, an eminent scientist, "a man of science, in the modern sense, of the first rank," as Professor Huxley calls him,—these are a few of his claims to consideration.

The profound and quickening thought of this most comprehensive thinker since Aristotle was never presented by him in a more simple and untechnical form than in his *Discourse on Metaphysics* and the correspondence with Arnauld relating thereto. These together with the *Monadology*, the last systematic presentation of his philosophy written by him a quarter of a century later, are here, at a nominal price, made accessible to the general reading public and to university students. If one will read these letters between Leibniz and Arnauld, and then the *Discourse on Metaphysics*, and finally the *Monadology*—and that is the best order in which to read the book—one will be introduced in the simplest and the best possible way to Leibniz's philosophy. The *Discourse on Metaphysics* is probably the best account of his philosophy which he ever wrote. His views underwent but little modification between the writing of the *Discourse on Meta-*

physics and the writing of the *Monadology*. The only important difference is in the introduction in the latter of a more artificial terminology.

Dr. Montgomery's little volume is adorned by a picture of the famous monument to Leibniz near the Thomas-Kirche in Leipsic, and enriched by a translation of the late Prof. Paul Janet's admirable *Introduction* to his *Œuvres philosophiques de Leibniz*. The type and paper are exceptionally pleasant to the eye; and altogether the translator and the publishers deserve the thanks of all lovers of stimulating thought and of all teachers and students of philosophy.

This book belongs to a series of inexpensive issues of philosophical classics. The series already includes Descartes's *Discourse on Method*, Hume's *Enquiry Concerning Human Understanding*, Hume's *Enquiry Concerning the Principles of Morals*, Berkeley's *Principles of Human Knowledge*, Berkeley's *Three Dialogues Between Hylas and Philonous*, Descartes's *Meditations and Selections from the Principles*, and *Kant's Prolegomena*; and other similar works are promised. The series puts the masterpieces of philosophy within the reach of all who may care to read them; and it places at the disposal of teachers of philosophy and of the history of philosophy a most valuable adjunct to their teaching, in the form of easily obtainable and inexpensive collateral reading to put in the hands of their students. In publishing these books the Open Court Publishing Company is doing a most commendable educational work, which deserves the heartiest encouragement from the reading public and from our colleges and universities.

George Martin Duncan.

Yale University.

Ethik. Eine Darstellung der ethischen Prinzipien und deren Anwendung auf besondere Lebensverhältnisse. Von *Dr. Harald Höffding*, Professor an der Universität Kopenhagen. Zweite Auflage der deutschen Ausgabe. Unter Mitwirkung des Verfassers nach der vielfach geänderten and erweiterten zweiten dänischen Ausgabe, übersetzt von F. Bendixen. Leipzig: O. R. Reisland. 1901. Pages, xvi, 618.

Professor Höffding's *Ethics* has reached its second edition in both the original Danish and the German translation. The second edition does not in any essential point differ from the first one. Professor Höffding has adhered to his principles, which may be characterised in his own words as "an ethics of welfare." *Welfare* in his language is practically the same as the principle of Utilitarianism. Professor Höffding defines it in terms of pleasurable feelings, the weak side of which has been the subject of a discussion between him and the editor of *The Monist* (Vol. I., No. 4.)

Leaving alone the moot point of the ultimate principle of ethics, which in the present case has very little influence upon the execution of the work, Professor Höffding's *Ethics* exhibits sound judgment and a combination of a respect for such institutions as the State, marriage, the dispensation of law in the courts, etc., with

a progressive spirit that would not allow traditions to bar out the aspiration for improvement.

The whole material of the book is divided into three parts: (1) The Condition of Ethics; (2) Individual Ethics; and (3) Social Ethics, which last is subdivided into: (*a*) The Family, (*b*) Society, (*c*) The State.

The first part, "The Condition of Ethics," discusses the following topics: (1) Positive morality and scientific ethics; (2) Theological and philosophical ethics. Professor Höffding denies that the principle of authority is tenable, declares that philosophical ethics is independent of theology and metaphysics, and suggests that Christian ethics in its original purity is non-theological. In discussing the valuation which is characteristic for ethical judgments, Professor Höffding distinguishes between the motive which prompts the performance of a certain act and the criterion by which it is judged; the former is subjective, the latter objective. He discusses the principle of Aristippus, that every moment of life is sovereign, and shows how higher organisation leads to a complicated interrelation of the different moments. The same is true of the individual, which is interconnected with its fellows by sympathy, the latter being the basis of the ethical sentiment. The principle of welfare, which appears as the ethical ideal, is not merely subjective, but also objective; and the objective ethics is to be divided into individual ethics and social ethics.

Speaking of conscience, Professor Höffding says that where it acts as instinct the individual does not as yet know what it is about; where it acts as an impulse, the individual has a dim notion of its final aim; and when it appears as practical reason, it has created a clear conception of ideals and rules (page 76).

As to the question whether one can do more than one's duty, we are told that man can do more than may be demanded of him, according to a reasonable expectation; but he can never do more than fulfil the request of his inmost conscience.

In the next chapter, we become acquainted with six different definitions of freedom of will: (1) As an expression from causality, generally known as indeterminism; (2) As an absence of external compulsion; (3) As an absence of internal compulsion; (4) As an ability to do something, viz., the endowment with the faculty and power of performing certain acts; (5) It may mean the liberty of choice in case one has the option between two or more possibilities; and finally (6) it is used in the sense of a will determined by ethical motives. Professor Höffding uses the term *freedom* only in the first sense, and consequently adopts the principle of determinism; he claims, however, and rightly so, that ethics and determinism are not contradictory ideas. On the contrary, indeterminism would render every act of will accidental, and the ethical character of an act depends upon its necessary connection with the whole personality. Ethics is without vitality unless it be based upon determinism.

Evil, according to Professor Höffding, is isolation, which may have originated

in indolence or in defiance. It springs either from ignorance or from delusion. It is ultimately only foolishness, which by persistence becomes hardness of heart. ▭ The least satisfactory part of Professor Höffding's ethics is his discussion of the theory of welfare; and it appears that he clings to his definition of welfare simply because the world of ethical beings is necessarily a world of feeling beings. Accordingly, feelings to him are indispensable, and being indipensable he takes the welfare of the feeling element, or pleasureable feelings, as its ultimate criterion. He concedes that lower animals, as well as a lower class of people, may very well be in possession of a greater permanent condition of pleasurable feelings. He explains it through a desire for progress, which has become an inalienable part of mankind. John Stuart Mill said: "It is better to be a dissatisfied man than a satisfied pig, and better to be a dissatisfied Socrates than a satisfied fool." Professor Höffding answers: "I must, however, say a good word for the pig and for the fool; for the difficulty is greater than Mill thought. . . . Man cannot place himself in the position of the pig without ceasing to be man, and Socrates cannot identify himself with the fool without obliterating the Socratean needs. If a pig could attain to the full satisfaction of its demands, would not its happiness be greater than that of man, whose desires and ambitions can never be fulfilled? And the same with the fool. . . . It is a psychological law that the degree of a sentiment is determined by the complete condition of the individual; and he who has gained a fuller satisfaction of his demands has no motive to compare his condition with that of others. There must be different degrees of happiness. It will be as in Dante's Paradise where there are different degrees of bliss. . . . In Dante's Paradise, all endeavor and all evolution are past, but will that be possible everywhere, and how will the principle of welfare be applicable to a comparison of conditions of different beings, among whom each for itself will have the character of complete contentedness?" (Pp. 129–130).

The final explanation which Professor Höffding gives may be an explanation why, in a world the essential characteristic of which is progress, a perfect satisfaction is impossible, and how the ambition to reach higher planes becomes a part of our own being; but it decidedly does not justify the principle of welfare in such a sense as Prof. Höffding explains it, as a maximum state of pleasurable feelings; or it would, if his definition of welfare should be upheld in ethics, condemn progress as an immoral process which ought to be either stopped, or at least retarded.

Having discussed the general notions of ethics, Professor Höffding enters the field of applied ethics, which he divides into two parts: (1) Individual Ethics, and (2) Social Ethics.

Justice is the main virtue of ethics, and it comprises self-preservation as well as self-sacrifice. Self-preservation is not merely an instinct, but also a duty. Suicide may be either the result of a mental aberration, or a liberation from obligations; it comes frequently as the expression of a debilitation of the will; but Professor Höffding does not deny that suicide may be a right, and even a duty.

Self-sacrifice sometimes proceeds from love, and sometimes from generosity. Akin to it is the devotion to truth, which latter is limited only by the love of truth itself. Its aim is to make truth victorious, and therefore truth should be spoken only in such a form as to let it find ready acceptance. To express ethical opinions where they are out of place is barbarism or Phariseeism.

In sociology, ethics finds its most important application, and social ethics is divided into three branches: (1) the family as based upon matrimony: (2) society, the free congregation of civilised beings, and (3) the State.

Professor Höffding is in favor of monogamy. He objects to free love as a mere excuse for fickleness. He demands the equal position of husband and wife, but he would not make marriage indissoluble according to the principle of the Roman Catholic Church. He touches upon the problem of prostitution, but does not enter into its intricate difficulties; he only claims that its prevalence cannot be explained as a mere revival of the primitive sexual relations; but he hopes that much can be done to improve conditions by giving women a greater scope of freedom, allowing them independence, and giving them a chance to earn their own living.

In his discussion of the place of women in society, Professor Höffding may be regarded as in perfect agreement with John Stuart Mill. He regards the emancipation of woman as a duty, and would also include the privilege of granting her all political rights.

As to the parents' rights over, and duty toward, children, Professor Höffding explains how the absolute power has been limited and modified, and how the State now exercises to a great extent the rights of watching over the physical welfare of children, and also over their instruction.

Society is based upon the recognition of the liberty of every individual. Nevertheless, the principle of liberty can be exaggerated, as was actually done in the eighteenth century.

The social question is a product of the modern development of society. It originates through the condition of having a smaller minority contrasted with large multitudes. In multitudes personality ceases to be considered, and it is the assertion of free personality which prompts to the ventilation of the social question. Professor Höffding recognises the existence of a dualism in the social order, which shows itself in a contrast between the classes. His investigations do not seem to touch the heart of the problem, and for all we know they may be better applicable to Europe than to England and America.

After a long discussion of civilisation, material as well as ideal, the civilisation of art, of religion, and the problems of State and Church, which of course has reference only to European conditions, and after a discussion of philanthropy (also ignoring the American phase of it), Professor Höffding descants on the nature of the State, which he characterises as compulsion. Whatever the State may do, it is throughout backed by the threat to compel obedience through the use of power.

The State originates through the national sentiment, and may be defined as "the organised people." One of its main functions is the dispensation of justice, which of course must not be identified with morality. Public opinion forms an important part in public life. The State has been defined as ethics incarnate, but on the other hand it has also been regarded as mere power. Höffding believes it to be the duty of the State to organise the life of the people in definite forms.

As to the constitution of the State, Professor Höffding prefers self-government, but although he recognises the preferences of liberty, especially of its educational influence, he grants that a free constitution implies dangers.

In his concluding chapter, he makes reference to Kant's treatise on perpetual peace, and he holds out the hope of its realisation, as Kant himself indicated, because it recommends itself to international commerce and to the very egotism of man.

Professor Höffding concludes his book with the maxim: "Be inspired only by great things, and be faithful in small things." P. C.

Beweis für das Dasein Gottes. Den Gebildeten unter den Zweiflern gewidmet von *Dr. Paul Schwartzkopff*, Professor zu Wernigerode. Halle a. S. und Bremen: C. Ed. Müller's Verlagsbuchhandlung. 1901. Pages, vii, 118.

"To-day it is generally granted that there is no proof of the existence of God." With this exclamation our author starts and proceeds to distinguish between the untenableness of the old proofs and the unprovableness of the idea in general. He maintains that the former does not imply the latter, and declares, "it would be strange, indeed, if the creator truly played hide and seek in his own works."

Schwartzkopff offers four proofs of the existence of God: (1) the cosmological, which is new in the form in which he presents it; (2) the teleological, which contains some good comments on the significance of pain and death in the economy of life; (3) the moral; and (4) the christological. The last two are not new and appeal to Christians only.

Schwartzkopff accepts the Kantian distinction of phenomenon and noumenon, which he calls the thing and its cause. The thing-in-itself, being a cause, is endowed with causality which implies time, and the question arises as to the relation of God, the cause of all things, to the individual egos. Each individual carries in himself his world, but all individuals together agree in this, that they have their worlds in common which thus form one great universe. The universe is the sum-total of all the world-conceptions of the agents who exist side by side. Whether or not this common universe is possessed of an external reality in space is of secondary importance; it exists most assuredly as a common product. Now, the basis of this common universe, its soul, its cause, is the world-soul or the All-cause, and this is the God of Pantheism. But Schwartzkopff does not stop here; he finds it

plausible to regard the world-cause as a personal author, who is an absolutely independent world-spirit.

We need not dwell here upon the insufficiency of Schwartzkopff's arguments which will convince only those whose habits of thought run in the same grooves. He speaks of cause (i. e., *Ursache*) where he ought to speak of reason, or *raison d'être* (i. e., *Grund*), and it goes without saying that his proof is lacking in logical precision as well as in power of demonstration. The teleological, moral, and christological arguments are still less satisfactory and will find feeble endorsement even in theological circles.

In spite of being a failure, the book is interesting. And why? The arguments offered are futile, but the personality of the author commands our sympathy. He clings to a belief in God, and his booklet presents his efforts to justify the belief. The reason of his failure, however, must be sought in the fact that he clings to a God-conception which in the circle of those who are trained in the school of science has become untenable. The problem of theology is no longer to seek for a new and a tenable proof of the existence of God, but to remodel the conception of God itself so as to make it conform to the demands of our scientific and philosophical knowledge. There is indeed no tenable proof of the existence of a God-individual, because God is no individual; he is God. He is not a person of the type of human personalities, but superpersonal, the condition of man's personality, the law of life, the authority of ethics, the standard of truth, the *raison d'être* of the laws of nature, the formative factor of the world. As such God exists. Let us find out what it is, and we shall thereby understand what God is.

In this way we propose to reverse the method of the antiquated theology, and our plan would not lead to the destruction of religion but to its rehabilitation upon the firm ground of facts. P. C.

DICTIONARY OF PHILOSOPHY AND PSYCHOLOGY. Including Many of the Principal Conceptions of Ethics, Logic, Æsthetics, Philosophy of Religion, Mental Pathology, Anthropology, Biology, Neurology, Physiology, Economics, Political and Social Philosophy, Philology, Physical Science, and Education, and Giving a Terminology in English, French, German, and Italian. Written by Many Hands and Edited by *James Mark Baldwin*, Ph. D. (Princeton), Hon. D. Sc. (Oxon.), Hon. LL. D. (Glasgow), Stuart Professor in Princeton University; With the Co-operation and Assistance of an International Board of Consulting Editors. In Three Volumes. With Illustrations and Extensive Bibliographies. Vol. I. New York: The Macmillan Company. London: Macmillan and Co., Limited. 1901. Pages, 644. Price, $5.00.

Surrounded, assisted, and abetted by a corps of eminent scientists and philosophers, Dr. James Mark Baldwin, of Princeton University, has undertaken the first colossal encyclopedic work of the present century,—a work sadly needed and nobly

achieved, even in its few shortcomings. The five chief countries of modern civilisation, America, England, France, Germany, and Italy have co-operated in the task, and the international character of its interest and scholarship, not to speak of its imposing, nay almost unnerving, array of domestic contributors, is in itself sufficient to stamp it as a work of depth, range, and uniqueness. Like the brow of the messenger of Henry IV., its veriest title-leaf and list of contributors foretell the nature of a tragic volume. As the editor says, "There is hardly anything in the work which has not the support of a group of men of the highest authority. This should be remembered by the single writer and student who finds this or that point unsatisfactory. *He is one; we are many.*" Before this multitude, criticism stands aghast, checked, thwarted at the very outset. The book will have none of it.

Two purposes were entertained by Professor Baldwin in the conception of the work: "first, that of doing something for the thinking of the time in the way of definition, statement, and terminology; and second, that of serving the cause of education in the subjects treated." The subject-matter of the *Dictionary* is philosophy and psychology, mostly psychology, or rather the sciences tributary to psychology. "We have aimed," says the editor, "to present science—physical, natural, moral—with a fullness and authority not before undertaken in a work of this character. In the selection of the topics, in the form and length of treatment, in the bibliographical lists, this emphasis will be found throughout." With this extension comes a corresponding limitation. The work eschews the history of philosophy although delving considerably into philosophical biography. "Rather have we aimed at truth to history, and fair appreciation of the spirit of historical research. More particularly, also, is it the history of conceptions rather than that of terms that has concerned us. Lexicographical and linguistic determinations are largely foreign to our work. Meanings, with their historical development, together with the terms which have expressed them and their variations,—these are the essentials of our quest." And again: "It would be useless to attempt in any compass, short of an independent work as large as this, to make a Dictionary of Greek and Scholastic Philosophy. It should be done; it is much needed: but we have not attempted it. We include special articles on Greek and Latin Terminology, with select glossaries of representative terms; and it will be found that many of the finer distinctions of scholastic as well as of ancient thought are brought out in connection with the terms which in our modern vocabulary express or represent them. Yet when all is said, the student of scholastic thought, as of Greek thought, will find so many gaps that it is only just to our limited purpose to warn him of them in advance. It is a change which has come into the subject,—this facing of philosophy towards science and modern life, instead of towards logic and ancient life,—and in consciously accepting the change we accept as well the inevitable criticism it will bring upon us."

Then comes the apology militant for the prominence given to psychology.

"No further justification of it is required than the statement that this is what we set out to do,—to prepare a work devoted to philosophy and psychology. The association of these two subjects is traditional and, as to their contents, essential. Psychology is the half-way house between biology with the whole range of the objective sciences, on the one hand, and the moral sciences with philosophy, on the other hand. The claim to this place laid by psychology to-day is no more plain than is the proof of it which the results in this department of research make good. The rise of experimental and physiological psychology has caused the science to bulk large towards the empirical disciplines, as it always has towards the speculative; and the inroads made by psychological analysis and investigation into the domains where the speculative methods of inquiry, spoken of above, were once exclusively in vogue, render permanent and definite the relation on that side as well. In biology, in sociology, in anthropology, in ethics, in economics, in law, even in physics, the demand is for sound psychology; and the criticism that is making itself felt is psychological criticism. How could it be otherwise when once it is recognised that science is the work of mind, and that the explaining principles by which any science advances beyond the mere cataloguing of facts are abstract conceptions made by processes of thought? It will be found, therefore, that it is upon the psychology of this work that most of its lines converge; and it is in its psychology that many of the hopes of its producers centre. That the psychology be found less adequate than it might be,—that is only to be expected; that it be found less adequate than it should be,—that is the judgment we wish most of all to escape."

The bibliographical part of the *Dictionary*, although not yet published, we look forward to with the liveliest anticipation. This will indeed fill a great want. It will constitute the third volume of the work, the second volume containing the remainder of the text and the indices. We shall not speak of the details of the work, its generally excellent references to the literature, its listing of the foreign equivalents of terms, etc., etc. In all these respects, the *Dictionary*, like Cæsar's wife, is above reproach. We have but one bone to pick with the editor,—and that not the femur of a mammoth. It is the space he has given to the favored sciences from which modern psychology draws its nourishment,—his rich enlargement of the pasture-land of the psychologic milch-cows: biology, sociology, physiology, etc. To the contributors in these departments he has given free rein, and they have disported themselves with both grace and vigor. Of the favors accorded to theology we shall only incidentally speak.

The most tristful feature of the *Dictionary* is decidedly the department of biography. It seems to us that the function of a Dictionary of Philosophy should be, not to record everything that "any reader of philosophy should know,"—for that would mean supplanting all other dictionaries under the sun. No person, or body of persons, can say what the reader of philosophy must know in order to be able to read the literature of philosophy,—for that would be tantamount to determining

the precise nature and history of every word ever occurring in the books on philosophy, and the precise preparatory knowledge that each reader possesses. But what the reader does want to find in a Dictionary of Philosophy is the meanings of the purely technical terms in philosophy that he cannot readily find, and cannot expect to find, anywhere else. Any history of philosophy, any good biographical dictionary,—and these the reader of philosophy must certainly be supposed to have,—will give far more information about the lives of philosophers than Professor Baldwin's *Dictionary*,—and all the space, therefore, devoted to biographies in his *Dictionary* is as good as wasted, for it has swollen the bulk of the volume and taken away space rightfully due to purely philosophical terms, which in many cases have received no more technical or elucidative treatment than they have in the *Century Dictionary*. And in this department, as in others, the selection of names has been unbalanced and unmethodical. The late Professor Atwater, the Hodges, the Alexanders, (all estimable and cultivated men, but not at all widely cited in philosophical literature), a host of biologists, embryologists, theologians, preachers, jurists, etc., are admitted, while such names as Fontenelle, Charles Fourier, and Cournot, not to mention Euler, Galileo, and the other great scientists in whose writings genuine philosophy abounds,—have been either forgotten or rejected. True, there is no good reason why they should be included, but no more should the others. If the editor, or other person responsible for this department had lived in the eighteenth century, they would certainly have been admitted; but now only the scientists that make for social and biotic psychology are invested with Olympian honors. Our modern vision of the philosophic horizon has indeed greatly shrunken!

The same remarks apply perhaps even more forcibly to the multitude of irrelevant biological, economic, juristic, and theological terms, for which the average dictionary is sometimes as good and in most cases better; for example, "gestation," "congestion," "cold-blooded animals," "coelom," "coelentera," "enterozoa," "female" (!), etc.; "joint cost," "court," "*damnum absque injuria*," "habeas corpus," "case-law," "humilitation of Christ," "diaspora," etc.,—not to speak of the admission of such common words as "kindergarten," "Byzantine," etc. These are all words,—and we have mentioned a very few only,—that one would never think of consulting a philosophical dictionary for. And what is more, they are all accessible. But the great body of foreign and English literature which deals with the purely technical part of philosophy (notably metaphysics and logic) is not; references to the literature are excellent in their way but in essential points they are unsatisfactory: they merely tell us where information may be found that we knew already existed, but which now as then remains just as accessible or inaccessible as before. A dictionary of physics, chemistry, or mathematics could never be constructed on this plan,—a plan that subordinates its main subject to the sciences that are ancillary to it.

We have only to look at the meagre space devoted to topics connected with

the philosophy of science, and to the character of the definitions in the exact sciences, to be fully impressed with this fact. The definitions of mechanical and mathematical terms in the present first volume are, we may venture to say, in the majority of cases not as complete technically as the definitions in the *Century Dictionary*. Why are they here then? Because readers of philosophy will meet them and must know what they mean? Yes, but they have also, all of them, their High School Dictionaries, their abridged Websters, their text-books of physics. The definitions are all excellent. But that is not the point. If these terms are to figure in a philosophical dictionary, they must *also* be considered in their *philosophical and metaphysical* connections. But, in the present volume, there is scarcely the vestige of a reference to their import or history in this direction. We may instance, as an example, the terms *energy* and *force*. Of the interesting history of the philosophical discussions centering about these terms, of the sempiternal metaphysical problems involved, (to which no less a man than Leibnitz could devote a goodly portion of his thought), and of the very extensive modern philosophical literature that has grown up around these conceptions,—not a word, not even the palimpsestic reminiscence of a bibliographical reference! We look about at random in the *Dictionary*, and find such words as "foreign," "funding," "gross earnings," "charter," "chastity," "comity," "body and flesh," "barter," "artery," "Aryan," "antenna," and even "Apollinarianism" (not the antinomy of "alcoholism," which is also represented in the *Dictionary*, but one of the surreptitious contributions of Professor Wenley); yet amidst this unphilosophical conglomerate we seek in vain for even a statement of the character of the important philosophical discussions concerning *Axioms*, which, if we could borrow for a moment the enthusiasm of that eminent mathematician Dr. George Bruce Halsted, of Texas, we should say "were shaking two continents;" and the very meagrest references only are given to this literature, which is considerable. The same remark holds true of the topics "attraction" and "gravitation."

We again look at random into the *Dictionary*. "Character" is defined psychologically and biologically; likewise "characteristic." But if one met the phrases "universal character" and "geometric characteristic" in reading Leibnitz, one would have to turn to one of the ordinary dictionaries to find their meanings: they are not here, despite the important philosophical developments of which they form part or have been the origin. And this remark holds good of historical terminology at large.

It is true, the editors expressly disclaim the intention of writing a lexicon of philosophy, or a history of philosophy, or,—the restrictions accumulate so fast that one would fain say,—anything at all on philosophy. Their attitude is clear and outspoken on this point. But we have the harassing suspicion that the Preface is a *post festum* performance, and that after the mountainous character of their task had loomed ghost-like and threatening from the nebulous abysm before them, the limitations naturally and gracefully imposed themselves from sheer exhaustion. It

is true, time gallops with the metaphysician as with the lover, and philosophy now "faces toward science and modern life instead of toward logic and ancient life." But Greek philosophy and even Scholastic philosophy are no more blasted with the marks of antiquity, as the play hath it, than are such enlivening subjects as chiliasm, kenosis, homoiousia, homoousia, Eutychianism, and our old friend Apollinarianism, to which the courtesies of modernity have been ungrudgingly extended. If the ordinary-dictionary surplusage, above indicated, had been excised, surely much space could have been rescued, not only for Greek and Scholastic philosophy, but also for modern philosophy,—say in the style of the little sketch on "Imaging" at page 518. Both would have supplied a real want, which the biographies, much of the biology, the economics, the jurisprudence, etc., good as they may be, do not, because readily and more fully accessible in other books. Frankly, in this point, we think a great opportunity has been missed.

The work indeed bears branded upon its front the signature of its age, the age of Psychology,—not of pure psychology, but of the applications of physics, biology, and physiology to psychology. Each psychologist has his specialty or predilection, and indulges in it, making "all the choir of heaven and the furniture of the earth" circle round the science that supports it. With the present editor it is the theory of development, the biological and sociological analogues of the psychologic process, and incidentally theology, that have predominance. If Professor Scripture had edited the volume, its pages would have bristled like the fretful porcupine with instruments, wires, and clickers of varied hues, and philosophy would henceforward have figured as the abigail of experimental physics. And so with the rest.

Now, there is no objection to indulgence in specialties; it is the life of science; but it is not philosophy, although consistent with philosophy. Professor Wundt, specialist as he is, could never have produced a work like the present, which, however serviceable, however accurate, however creditable to all concerned, sins grievously on the side of genuine universality,—to attain the shadow of which it has in its vaulting ambition o'erleaped itself.

This is the sum of our criticism. The spirit of Darwin, not the spirit of Descartes, Leibnitz, and Kant, brooded over the deep when Professor Baldwin fashioned his philosophical cosmos,—a gigantic spirit withal, and one that moved the waters deeply. From that movement there came forth a leviathan, on the mighty anatomy of which our well-meant criticism constitutes, we frankly admit, but a tiny wrinkle. Professor Baldwin's achievement, not to speak of the joint labors of his collaborators, is great, and has been performed with the rarest conscientiousness and ardor. It is a monument of scholarly generalship, and, considering the stupendous difficulties that encompassed its erection, is in many ways commensurate with the lofty aim that the editor set himself. It is not for us to underrate the unselfish labors that years of devotion to science entail; *in magnis voluisse sat est;* and if we have absented ourselves at times in our remarks from the felicity of

outright commendation, it, too, has been for science's sweet sake. *Non omnia possumus omnes.* T. J. McCormack.

Elementare Stereometrie. Von *Dr. F. Bohnert*, in Hamburg. Mit 119 Figuren. Sammlung Schubert IV. Leipzig: G. J. Göschensche Verlagshandlung. 1902. Pages, iv, 183. Price, 2.40 Marks.

Mathematische Optik. Von *Dr. J. Classen*, Assistent am physikalischen Staatslaboratorium zu Hamburg. Mit 52 Figuren. Sammlung Schubert XL. Leipzig: G. J. Göschensche Verlagshandlung. 1901. Pages, x, 207. Price, 6 Marks.

Versicherungsmathematik. Von *Dr. Wilhelm Grossmann.* Sammlung Schubert XX. Leipzig: G. J. Göschensche Verlagshandlung. 1902. Pages, vi, 218. Price, 5 Marks.

Differential- und Integralrechnung. Erster Band: Differentialrechnung. Von *W. Franz Meyer*, in Königsberg in Pr. Mit 13 Figuren. Sammlung Schubert X. Göschensche Verlagshandlung. 1901. Pages, xviii, 395. Price, 10 Marks.

We have again to announce the appearance of several volumes of the admirable series of mathematical text-books edited by Professor Schubert of Hamburg, and are glad to see that the collection is so rapidly nearing completion. Designed to embrace all the departments of theoretical and applied mathematics (so far, forty volumes have been announced), its component works necessarily diverge widely from one another both in character and comprehensiveness, and despite the claim of the series for unity and systematic elaboration, the individual and technical idiosyncracies of the authors as well as the subjects of the different books, have to be taken into account in estimating their worth and usefulness.

To those acquainted with the excessive specialisation of mathematical thought in the last half century, the situation is quite intelligible. The natural direction has been departed from in the text-books of this field even more markedly than in the domain of physics, and while for those who have followed and assimilated it, it has brought both theoretical and practical power, to the uninitiated it is nothing less than bewildering, especially in its luxuriance of terminology and symbolism. If this symbolism and terminology were absolutely logical, as in many cases it is, and could be universally adopted, as in most cases it is not, there would be little objection to its exploitation. But its intricacies are sometimes arbitrary and altogether superfluous, and only add the hair-splitting subtleties of Mediævalism to the unnatural and inflexible logic of the Alexandrian school. Euclid still dominates to a large extent the presentation of mathematics. Mathematicians never tire of insisting that geometry is a "physical" science, yet how many text-books develop it from its physical basis, and present the sensuous images and resulting logical concepts of each department *genetically* and *phoronomically* from the start,

before proceeding to establish the isolated and disjoined propositions that constitute in their logic "the necessary and sufficient" elements to construct a system? Most text-books of mathematics, like most text-books of physics and chemistry, where not the outcome of naïve dependence and imitation, appear to be written more to forestall the criticisms of colleagues, and to adhere unthinkingly to prevailing dogmas, than with the desire to open a new field of knowledge *permanently and with the least effort* to students. To sin in the statement of orthodox definitions, framed to conform with the most recent fashionable philosophy, or in the necessary orthodox baldness and unintelligible method of stating results and propositions, is much more to be deplored, it would seem, than lack of success in rendering the subject intelligible to learners. To meet the disapproval of men who have taken upon themselves the gratuitous task of defending the mathematical philosophy of a Gauss or a Riemann, or the physical philosophy of a Thomson and a Tait, is more to be feared than the damning to intellectual ruin of tens of thousands of innocent students whose posthumous protests will never be heard. But this is the rare privilege that educators, after the precedent of priests and princes, have reserved for themselves since that immemorial time when they thwacked with their blunted intellectual weapons the dunderpates of ancient Egypt. Add to this the endeavor of incoherently packing into an elementary text-book the sum-total of the results of all the various special methods of each department, and the cup of confusion is full.

It would be ungracious of us to apply any of the foregoing strictures in their full force to the books of Dr. Schubert's excellent series. They do vary in their plan and scope, greatly. Some of them are extremely simple and methodical, as for instance Dr. Schubert's *Arithmetic* and *Algebra*, Professor Pflüger's *Plane Geometry*, and Dr. Bohnert's *Trigonometry*, all formerly noticed in our pages. But it is a far cry from these books to Dr. Pund's *Algebra*, and the higher *Geometries* of Drs. Simon, Böger and Schröder,—not to mention Professor Holzmüller's very elaborate treatise on *Solid Geometry*. There does not, in fact, appear to be the same continuity between these works as there was between the little volumes of the small Göschen series, also edited by Dr. Schubert,—commendable as the larger volumes individually are. But this may be due to the fact that many of the constituent links of the series are still unpublished,—as, for instance, Dr. Schubert's *Elementary Analysis* (*Niedere Analysis*), from which, as from Professors Braunmühl and Günther's *History of Mathematics* we may expect much.

The four new works of the series which have just come to hand, are Dr. Bohnert's *Elements of Solid Geometry*, Dr. Classen's *Mathematical Optics*, Dr. Grossmann's *Mathematics of Insurance*, and Dr. Meyer's *Differential Calculus*.

Dr. Bohnert's book, like his *Trigonometry*, is kept within modest bounds; it treats of the conventional parts of solid geometry in tolerably genetic manner, and makes extended use, for example, of Cavalieri's principle, Guldin's and Simpson's rules, and also Heinze's principle. The conic sections are also briefly treated in

their connection with solid figures. The author's chief indebtedness, which will characterise his work, is to Holzmüller, Servus, and Heinze.

Dr. Classen's work diverges considerably from the usual presentations of mathematical optics. He has sought to develop only those primary aspects of optics that are not in need of any special theoretical conception regarding the nature of light but may be deduced mathematically from a few indubitable experiential facts. Ordinarily, the undulatory theory, that is to say, phenomena of interference and diffraction, of polarisation and double refraction, are treated by preference, while the laws of geometrical optics are much neglected. The works on purely geometrical optics, on the other hand, sin in the opposite direction. Dr. Classen, now, after the precedent of W. Voigt, assumes five very simple facts, and then determines the form that must necessarily be assumed by the mathematical function that completely represents those facts, and reaches thus the general form of the undulatory function, which he developes for the special cases. He then proceeds to the phenomena of interference (Huygens's principle), and in a similar manner to the treatment of optic images (including Gauss's dioptrics, etc.), to the subject of achromatism, to Thiesen's theory, and to phenomena of diffraction. Polarisation and double refraction are excluded. Dr. Classen believes he has accomplished in this book what has never been accomplished before,—namely, presented in rigorous form all the facts that the student must be absolute master of before he can profitably take up investigations of the nature of light and of the more complicated luminous phenomena, or approach the construction and perfection of optical instruments. Some knowledge of the calculus is requisite to read the work.

Dr. Grossmann, in his book, has endeavored to present the mathematical formulæ controlling the application of the principles of insurance. He has developed these formulæ by elementary methods, and considered not only the forms of insurance connected with the life and death of one or several persons, but also the various modern forms of accident and invalid insurance. He has, in fine, furnished a book of value to the prospective actuary.

Dr. Meyer apologises for adding another treatise on the Calculus to the already large number of excellent text-books on this subject, but he has been moved to do so by the fact that the series would be incomplete without such a work. He has therefore written the book with special reference to this purpose and has actually considered the other books in so doing. Seeing that the applications of the Calculus to the physical sciences have been adequately treated by Nernst and Schoenfliess and by Lorenz, he has paid special attention to the subject of errors, with so much the more profit as these calculations are eminently characteristic of the Calculus, in its applications to the sciences. He has deferred the consideration of curves and surfaces, from the point of view of the Differential Calculus, to his second forthcoming volume on the Integral Calculus, to which he will also adjoin his historical notices.

Twenty-four volumes still remain to complete this comprehensive series, and

it merely remains for us to add that the publishers of the series have done their utmost to secure the best possible typography compatible with cheapness, and that special point has been bestowed on obtaining accuracy and neatness in the figures. The impression is heavy, however, and does not do full justice to the typography.

T. J. McC.

THERMODYNAMIQUE ET CHIMIE. LEÇONS ÉLÉMENTAIRES A L'USAGE DES CHIMISTES. Par *P. Duhem.* Paris: Librairie Scientifique A. Hermann. 1902. Pages, ix, 496. Price, 15 francs.

Professor Duhem has added another work to his rapidly increasing list of excellent publications on physical chemistry, and prefaces the book, which will probably be more widely read than any that he has hitherto written, with the following remarks:

The development that thermodynamics has undergone in the last fifty years has attracted the attention of men who have devoted to it the most varied kinds of studies. Opinions not long since accepted without opposition regarding the aim and scope of physical theories, have been completely overthrown. Mechanics has ceased to be the ultimate explanation of the inorganic world; it is now nothing more than a chapter, though the simplest and most perfect, of a general body of knowledge that controls all the transformations of inanimate matter; and the question is not now that of discovering the inward nature and essence of these transformations, but solely to co-ordinate their laws by the help of a small number of fundamental postulates. And philosophy follows with anxious heart the phases of this evolution, which is one of the most considerable that cosmology has ever undergone.

At the beginning of the nineteenth century, mathematical physics furnished a multitude of fascinating and fecund problems to analysts; and the efforts which were put forth to resolve these problems have given rise to more than one branch of modern analysis; but the fear was rife that the veins worked by so many transcendent genuises had been exhausted. Now, the new doctrine generalises to the uttermost limits the data of the problems which were formerly attacked; it has given them an entirely new setting, and in this way has opened vast vistas to the researches of the mathematician.

The different branches of physics stand apparently isolated; each of them evokes its own principles, and proceeds by its own special methods. To-day, however, the physicist knows that his work is not concerned with a loosely-connected bundle of branches which are independent of one another, but with a tree of which the different boughs are the offshoots of the same trunk; all the parts of science that he cultivates appear to him rigorously connected, like the members of an organised body.

In a word, the laws formulated by thermodynamics introduce rational order into the most confused chapters of chemistry. A small number of simple and lucid

rules reduce to order what was once a chaos; the circumstances in which the various reactions are produced, the conditions which check them and assure chemical equilibrium, are determined by these theorems with geometrical precision.

Thus, the philosopher, the mathematician, the physicist, and the chemist, are equally eager to become acquainted with the science of thermodynamics in its modern form, and to obtain a clear grasp of its principles, methods, and results. But each of them is interested in a different aspect of the subject and each requires a special treatise adapted to his purpose. The present work of M. Duhem is intended for the chemist; but we hope that the one for the philosopher may also soon be forthcoming from his pen.

The first five chapters of the present book are devoted to an examination of the foundations on which chemical statics and dynamics rest, and to the exposition, devoid of complicated algebraical analysis, of the elementary ideas of thermodynamics. Considerable space is devoted to recent applications of a thermodynamics to chemistry, special attention being given to "that admirable law of phases, an algebraic theorem born of the genius of J. Willard Gibbs and rendered one of the most valuable controlling principles of modern chemistry by the masters of the Dutch school, Van der Waals, Bakhuis Roozboom, and Van't Hoff." American readers not familiar with the history of this science will be glad to learn that Professor Gibbs is a countryman of ours.

The remainder of M. Duhem's work is devoted to purely technical questions of chemistry, and need not claim our attention here. *μ.*

L'Année psychologique. Publiée par *Alfred Binet*. Avec la collaboration de MM. H. Beaunis and Th. Ribot. Secrétaire de la Rédaction: Victor Henri. Septième Année. Paris: Librairie C. Reinwald. Schleicher Frères, Éditeurs. 1901. Pages, 854. Price, 18 francs.

The *Année Psychologique* for the work of the year 1900 contains twenty-four original memoirs: The first is a long biological monograph on the "Habits of *Bembex* (the digger-wasp)." The four following monographs are by Ch. Féré, on the "Variations of Excitability and Fatigue," "The Influence of Agreeable and Disagreeable Excitations on work," "The Alternative Work of the Two Hands," and "The Comparative Excitability of the Two Cerebral Hemispheres of Man." M. Binet contributes nine papers,—two on "Esthesiometry," one on the "Technique of the Measurement of the Living Head," four kindred papers on "Cephalometry," one on "Observing and Imaginative Types," and lastly one on "A New Apparatus for Measuring Suggestibility." There are three memoirs by M. Simon on "Cephalometry" and two on "Backward Children;" the remaining papers are: (1) "On the Participation of Nervous Centers in the Phenomena of Muscular Fatigue," by J. Jotyko; (2) "Muscular Effort and the Fatigue of the Nervous Centers," by MM. Aars and Larguier des Bancels; (3) "Intellectual Work in its Relationship with Muscular Force Measured on the Dynamometer," by J. Clavière;

(4) "Have We Specific Sensations of the Position of Our Limbs?" by J. Claparède; (5) "On the Different Information that the Eye and the Hand Give Us Respecting the Volume of Bodies," by J. Laureys, with comments by J. J. van Biervliet; and (6) "On the Estimations of Colored Surfaces," by Larguier des Bancels.

The second part of the *Année* contains the usual analytical notices of the works in psychology published during the year 1900, including a valuable bibliographical table of everything that has appeared in psychology and its cognate departments, together with an index of authors. *μ.*

Studies in Auditory and Visual Space Perception. By *Arthur Henry Pierce, Ph. D.*, Professor of Psychology in Smith College, Late Kellogg Fellow at Amherst College. New York, London, and Bombay: Longmans, Green, and Co. 1901. Pages, 361. Price, $2.00.

"The several essays here brought together," says Mr. Pierce, "appear as the regular publication demanded of the incumbent of the Kellogg University Fellowship of Amherst College at the expiration of his official term. . . . They purport to be contributions to a particular field of experimental psychology. Whatever unity pervades them is determined rather by the general identity of subject-matter than by the continuous application of any single principle of interpretation. . . . The general theoretical position may be defined as nativistic, the nativism being of that moderate and elastic form which acknowledges the large and all-important rôle played by an organising and systematising experience. To determine the details of the particular experiences under which some of our visual and auditory spatial perceptions, illusory or otherwise, appear, has been everywhere the incitement to these investigations."

The little work does not cover the entire field of space-perception and omits altogether the sensations of movement that have been so interestingly investigated by Dr. Mach. The main discussions centre about auditory space, localisations of sound, auditory orientation, etc., and the various sense-illusions (the illusion of the Kindergarten patterns, Poggendorff's illusion, etc.). The literature is given in the first case, but not in the latter. There is no index. *μ.*

Der positive Monismus und das einheitliche Princip aller Erscheinungen. Von *Gustav Ratzenhofer*. Mit drei Figuren. Leipzig: F. A. Brockhaus. 1899. Pages, xii, 157. Price, 4 Marks.

Positive Ethik. Die Verwirklichung des Sittlich-Seinsollenden. Von *Gustav Ratzenhofer*. Leipzig: F. A. Brockhaus. 1901. Pages, xiv, 337. Price, 8 Marks.

Ratzenhofer's works on *Politics* and *Sociological Cognition* have attracted some attention in his native country, and their fundamental philosophical theories are quite naturally looked upon by their author himself with the greatest confidence in their truth, adequacy, and timeliness. He has chosen the name *Positive*

Monism as the best characterisation of his system,—not the positivism of Comte, he remarks, nor wholly that of Mill, and certainly not that of materialism, with which positivism is frequently identified. He is enthusiastic about the monistic theory, asserting that it has always been the ideal of philosophy; yet at the same time his monism is not conceived in the sense of Haeckel's, which is in his view simply materialism disguised. "The recognition of the unity of law in all phenomena, the subjection of all human aims and efforts to this law, the eradication of all contradictions and conflicts in the problems of life, are the aim of his philosophy." In his view, science is not an end in itself, but the handmaid of ethics; its purpose is positive: the perfection of the human race; while it also gives to our endeavors a solidity and reality which teleology has vainly sought hitherto to conceive as immanent in Being at large. Sociological and historical cognition becomes therefore the center of Ratzenhofer's system. In parallelism with the unitary character of all phenomena on the ontological and cosmological side, is placed the principle of the unitary character of all psychical and social phenomena. Through sociological cognition, Ratzenhofer's monistic positivism leads to an elaborate doctrine of politics, and since the latter contains the means for perfecting society, it also leads to a "positive ethics," the purpose of which is the perfection of the individual. By his system, the author believes that "absolute errors" can be avoided. In opposition to Kant, he takes the stand that a theoretical establishment of ethics and religion is eminently possible, and lays great emphasis on the fact that his system gives so large and systematic a place to practical morals and religion. *μ.*

Georg Wilhelm Friedrich Hegel's Vorlesungen über die Philosophie der Religion. Mit einem Commentar herausgegeben von *G. P. J. Bolland*, Professor der Philosophie an der Universität Leiden. Erster Teil, Text. Leiden: A. H. Adriani. 1901. Pages, xxi, 708.

Georg Wilhelm Friedrich Hegel's Vorlesungen über die Philosophie der Religion. Mit einem Commentar herausgegeben von *G. P. J. Bolland*, Professor der Philosophie an der Universität Leiden. Zweiter Teil, Commentar, erste Hälfte. Leiden: A. H. Adriani. 1901. Pages, 272.

The present edition of Hegel's celebrated *Lectures on the Philosophy of Religion* is based on the older editions of Marheineke (1832 and 1840), but has been entirely re-elaborated in its external features by Dr. Bolland and brought more into conformity with present needs. It will be remembered that the original lectures did not come directly from Hegel's own pen, but were compiled from the notes of his students. The present age, remarks Dr. Bolland, is entirely "de-Hegelised" and is consequently in need of special Hegelian treatment. He has therefore not only altered the text in places, but has illuminated it with commentaries and by the citation of parallel passages from other authors and from other works of Hegel. Dr. Bolland has brought much learning to bear upon his task, and his labors will be of undoubted usefulness to students of Hegel. *u.*

Die Begriffe und Theorien der modernen Physik. Von *J. B. Stallo.* Nach der dritten Auflage des englischen Originals übersetzt und herausgegeben von Dr. Hans Kleinpeter. Mit einem Vorwort von Ernst Mach. Mit einem Porträt des Verfassers. Leipzig: Verlag von Johann Ambrosius Barth. 1901. Pages, xx, 332. Price, 8.50 M.

Tardy but adequate recognition the late Honorable J. B. Stallo has received from the country of his birth. His work on *The Concepts and Theories of Modern Physics* has enjoyed in America since its first publication in 1881 the highest reputation among scientists and thinkers. It is unnecessary for us to comment upon it here, or upon the high character of its author, who found leisure among one of the most prosaic of occupations to cultivate philosophical ideals. It was at the instance of Dr. E. Mach that the present work was translated into German, and to him also we owe the appreciative preface which is prefixed to the German translation. Mr. Stallo's object was essentially the same as that of Dr. Mach, namely, to "eliminate from science the latent metaphysical elements." And the fact that both these thinkers, starting from different points of view and entirely independent of each other, reached virtually the same conclusions on several of the central problems of the philosophy of science, cannot but have a stimulating and beneficent effect upon this line of research. The translation by Dr. Hans Kleinpeter is adequate and faithful, and it can only be hoped that his work will find a favorable reception in the country of Mr. Stallo's nativity. *μ.*

La psychologie du rêve au point de vue médical. Par *N. Vaschide* et *H. Piéron.* Paris: Librairie J.-P. Baillière et Fils. 1902. Pages, 95. Price, 1 fr. 50.

MM. Vaschide and Piéron have continued in various forms their researches on dreams, with part of which the readers of *The Monist* are acquainted, and the present little volume is devoted to the subject from the point of view of medicine. General pathology is concerned with this subject more than is commonly supposed, dreams playing an important part in infectious diseases such as typhoid fever, and having also considerable importance in local intestinal, cardiac, and pulmonary affections. In hysteria, dreams are not only a symptom, but also frequently an active factor, of the disorders that produce them. The little volume is one of the series entitled "Les actualités médicales," which aims to present the most recent investigations in medicine. *μ.*

Phantasieen eines Realisten. Von *Lynkeus.* Zweite unveränderte Auflage. Dresden und Leipzig: Verlag von Carl Reissner. 1900. Pages, vi, 216.

Lynkeus is the *nom de plume* of a German author whose real name is Irvin Bauer. The present volume contains in two parts more than sixty little sketches, many of them of great interest and full of thought. He causes to pass before our eye figures representative of all classes of society, of all types of mankind,—the

pessimist, the optimist, the philosopher, the scholar, the misanthrope; he portrays scenes in the life of Michelangelo, Confucius, the Troubadours, of Timur and Hafiz, the philosophy of Mih-Tse, Alexander the Great, the hero of the battle of Austerlitz, King Solomon, Holbach, the wife of Emperor Tcheu-Sin, Julius Cæsar, Erasmus, Emperor Asoka, etc., etc. A definite tendency is not perceptible, but most of the sketches are pleasing and instructive, and we lay the book aside satisfied that we have met an author who does not go to extremes and yet can entertain us with his genuis by comments as well as suggestions implied in his little unassuming stories.

PROBLEME, KRITISCHE STUDIEN ÜBER DEN MONISMUS. Von *Dr. Heinrich Schoeler*. Leipzig: Verlag von Wilhelm Engelmann. 1900. Pages, viii, 107.

This pamphlet is a lively discussion of philosophical problems. It begins with the denunciation of the idea of substance as a "humbug." Monism is refuted, for it believes in a physical substance and in the persistence of energy. The ideas of energy and force, of space and time, are full of difficulties, and motion itself defies definition. The ether hypothesis is a mere assumption, and the connection of energy and matter is incomprehensible. Such are the foundations of our knowledge. Life is a fact, but the origin of life has nowhere been observed, let alone understood. There is the duality of body and mind; and while materialism is crude and monism considerably superior, neither of them can be regarded as a successful explanation of the world. The result is that the world is incomprehensible. Though the riddle of the universe may not be behind phenomena, yet it lies in them as the source of their existence. We may call it energy or force; it is the eternally incomprehensible; it is the same which Siddhattha Gotama calls the *Avidya* and Fichte the *Unconscious*, which precedes as well as follows all consciousness.

PHYSIK DES SEELENLEBENS MIT DEM ERGEBNISSE DER WESENSGLEICHHEIT ALLER BEWUSSTSEINSZUSTÄNDE Allgemeinverständliche Skizze eines Systems der Psychophysiologie und einer Kritik der herrschenden Lehre. Von *Julius Pikler*, Dr. der Staatswissenschaft, Professor der Rechtsphilosophie an der Universität Budapest. Leipzig: Verlag von Johann Ambrosius Barth. 1901. Pages, 40. Price, 1.20 M.

Dr. Julius Pikler, Professor of Jurisprudence in the University of Budapest, addresses in this little pamphlet a young friend of his by the name of Erich, for the purpose of explaining to him the psychological problem in its several difficulties. He refers to a prior book of his, entitled: *The Fundamental Law of all Neuropsychical Life*, and discusses perception, comparison, memory, sensation, feeling, volition, deliberation, action, involuntary motions; and he states that self-preservation is the main principle of all the phenomena of soul life,—a principle which no psychologist has as yet fully understood or traced in its significance. He

criticises the wrong psycho-physical theories, and takes Herbert Spencer as a sample to set forth the errors of his definition of life. He explains attention from this principle of self-preservation. He criticises the doctrine of the localisation of functions, and concludes with the suggestion that most likely the neural movements will be found to be of an electrical nature,—a theory which in the meantime has been worked out by Professor Loeb, of Chicago.

PROBLEMI GENERALI DI ETICA. By *Giovanni Vidari.* Milan: Ulrico Hoepli. 1901. Pages, xvi, 271. Price, 4 Lire.

Struck with the prominence which practical ethical questions have attained in all civilised countries during the last twenty years, Mr. Vidari has been impelled to submit to close scrutiny the foundations of scientific ethics, and the methods which it should pursue. He has asked himself such questions as the following: Is the construction of a scientific ethics logically possible? Do we not meet in framing such a system intrinsic and insuperable difficulties? If not, how are the apparent difficulties of this character to be avoided? What are the limits of a system of scientific ethics, what its precise object, what its methods? As will be seen the author does not enter into any of the particular problems of practical ethics, but limits his view to general considerations entirely. It shows a wide acquaintance with the scientific and philosophical literature of America as well as of European countries. *μ.*

ESSAI SUR TAINE, SON ŒUVRE ET SON INFLUENCE, D'APRÈS DES DOCUMENTS INÉDITS. Avec des extraits de quarante articles de Taine non recueillis dans ses œuvres. Ouvrage couronné par l'Académie française (prix Bordin). Par *Victor Giraud,* Professeur de littérature française à l'Université de Fribourg (Suisse). Deuxième édition refondue. Paris: Librairie Hachette et Cie. 1901. Pages, xxxi, 311. Price, 3 fr. 50.

The present study of M. Giraud had, in its inception as a literary essay, the sanction of the great critic Taine himself. The author has carefully compared all of Taine's works and all their various editions, his unpublished manuscripts, his correspondence, etc., and with these materials has endeavored to trace in precise outline the history of Taine's thought and labors. He has devoted a chapter to Taine as a logician, another to Taine as a poet, another to Taine as the historian of English literature, and a final chapter on the influence which Taine exercised on the three or four generations of intellectual life which were in part contemporaneous with his career. Voluminous appendices comprising extracts from articles of Taine not represented in his collected works have been added. *μ.*

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THE MONIST

ON THE PSYCHOLOGY AND NATURAL DEVELOPMENT OF GEOMETRY.[1]

I.

FOR the animal organism, the relations of the different parts of *its own body* to one another and of physical objects to these different parts are *primarily* of the greatest importance. Upon these relations is based its system of physiological sensations of space. More complicated conditions of life, in which the simple and direct satisfaction of needs is impossible, result in an augmentation of intelligence. The physical, and particularly the *spatial*, behavior of bodies *toward one another* may then acquire a mediate and indirect interest far transcending the interest of the momentary sensations. In this way, a spatial image of the world is created, at first instinctively, then in the practical arts, and finally scientifically, in the form of geometry. The mutual relations of bodies are geometrical in so far as they are determined by sensations of space, or find their expression in such sensations. Just as without sensations of heat there would have been no theory of heat, so also there would be no geometry without sensations of space; but both the theory of heat and geometry stand in additional need of *experiences concerning bodies;* that is to say, they must both *go out beyond* the narrow boundaries of the domain of sense that constitutes their peculiar foundation.

Isolated sensations have *independent* significance only in the

[1] Translated from Professor Mach's manuscript by Thomas J. McCormack.

lowest stages of animal life; as, for example, in reflex motions, in the removal of some disagreeable irritation of the skin, in the snapping reflex of the frog, etc. In the higher stages, attention is directed, not to space-sensation alone, but to those intricate and intimate *complexes* of other sensations with space-sensations which we call *bodies*. Bodies arouse our interest; they are the *objects* of our activities. But the *character* of our activities is coincidently determined by the *place* of the body, whether near or far, whether above or below, etc.,—in other words, *by the space-sensations characterising it*. The *mode* of reaction is thus determined by which the body can be reached, whether by extending the arms, by a few or many steps, by hurling missiles, or what not. The *quantity* (*number*) of sensitive elements which a body excites, the number of places which it covers, that is to say, the *volume* of the body, is, all other things being the same, proportional to its capacity for satisfying our needs, and possesses consequently a biological import. Although our sensations of sight and touch are primarily produced only by the *surfaces* of bodies, nevertheless powerful associations impell primitive man especially to imagine more, or, as he thinks, to *perceive* more, than he actually observes. He imagines to be filled with *matter* the places enclosed by the surface which alone he perceives; and this is especially the case when he sees or seizes bodies with which he is in some measure familiar. It requires considerable power of abstraction to bring to consciousness the fact that we perceive the surface *only* of bodies—a power which cannot be ascribed to primitive man.

Of importance in this regard are also the peculiar *distinctive shapes* of objects of prey and utility. Certain definite forms, that is, certain specific combinations of space-sensations, which man learns to know through intercourse with his environment, are unequivocally characterised even by purely physiological features. The straight line and the plane are distinguished above other forms by their physiological simplicity, as are likewise the circle and the sphere. The affinity of symmetric and geometrically similar forms is revealed by purely physiological properties. The variety of shapes with which we are acquainted from our phys-

iological experience is far from being inconsiderable. Finally, through employment with bodily objects, *physical* experience also contributes its quota of wealth to the general store.

Crude physical experience impels us to attribute to bodies a certain *constancy*. Unless there are special reasons for not doing so, the same constancy is also ascribed to the individual attributes of the complexus "body." We also regard the color, hardness, shape, etc., of the body as constant; particularly we look upon the body as *constant with respect to space, as indestructible*. This assumption of spatial constancy, of *spatial substantiality*, finds its direct expression in geometry. Our physiological and psychological organisation is independently predisposed to emphasise constancy; inasmuch as general physical constancies must necessarily have found lodgment in our organisation, which is itself physical, while in the adaptation of the species very definite physical constancies were at work. Since memory revives the images of bodies before perceived in their original forms and dimensions, it supplies the condition for the recognition of the same bodies, thus furnishing the first foundation for the impression of constancy. But geometry is still in need of certain individual experiences.

Let a body K move away from an observer A by being suddenly transported from the environment FGH to the environment MNO. To the optical observer A the body K decreases in size and assumes generally a different form. But to an optical observer B who moves along with K and retains the same position with respect to K, K remains unaltered. An analogous sensation is experienced by the *tactual observer*, although the perspective diminution is here wanting for the reason that the sense of touch is not a telepathic sense. The experiences of A and B must now be harmonised and their contradictions eliminated,—a requirement which becomes especially imperative when *the same* observer plays alternately the part of A and of B. And the only method by which they can be harmonised is to attribute to K certain *constant* spatial properties independently of its position with respect to *other* bodies. The space-sensations determined by K in the observer A are recognised as *dependent* on other space-sensations (the position of K with

respect to the body of the observer *A*). But these same space-sensations determined by *K* in *A* are *independent* of other space-sensations, characterising the position of *K* with respect to *B*, or with respect to *FGH . . . MNO*. In *this* independence lies the *constant* with which we are here concerned. The fundamental assumption of geometry thus reposes on an *experience*, although of the idealised kind.

For the experiences in question to assume conspicuous and perfectly determinate form the body *K* must be a so-called *rigid* body. If the space-sensations associated with *three* distinct acts of sense-perception remain unaltered, then the condition is given for the invariability of the entire complexus of space-sensations determined by a rigid body. This determination of the space-sensations produced by a body by means of *three* space-sensational *elements* accordingly characterises the rigid body from the point of view of the physiology of the senses. This holds good for both the visual and the tactual sense. In employing this designation we are not thinking of the physical conditions of rigidity, in defining which we should be compelled to enter different sensory domains, but of the fact given merely to our spatial sense. Indeed, we are now regarding every body as rigid which possesses the property assigned, even liquids, as long as their parts are not in motion with respect to one another.

Correct as the oft-repeated contention is that geometry is concerned, not with *physical*, but with *ideal* objects, it nevertheless cannot be doubted that geometry has sprung from the interest centring in the spatial relations of *physical bodies*. It bears the distinctest marks of this origin, and the course of its development is fully intelligible only on a consideration of these traces. Our knowledge of the spatial behavior of bodies is based upon the *comparison* of the space-sensations produced by them. Even without the least artificial or scientific assistance we acquire abundant experience of space. We can judge approximately whether rigid bodies which we perceive alongside one another in different positions at different distances, will, when brought *successively* into the same position, produce approximately the same or dissimilar

space-sensations. We know pretty well whether one body will coincide with another, whether a pole lying flat on the ground will reach to a certain height. Our sensations of space are, however, subject to physiological circumstances which can never be absolutely identical for the members compared. In every case, rigorously viewed, a memory-trace of a sensation is necessarily compared with a real sensation. If, therefore, it is a question of the exact spatial relationship of bodies *to one another*, we must provide characteristics that depend as little as possible on the physiological conditions, so difficult to control. This is accomplished by comparing *bodies* with *bodies*. Whether a body A coincides with another body B, whether it can be made to occupy exactly the space filled by the other, that is, whether under like circumstances both bodies produce the same space-sensations, can be estimated with great precision. We regard such bodies as spatially or geometrically equal in every respect,—*as congruent*. The *character* of the sensations is here no longer authoritative; it is now solely a question of their *equality* or *inequality*. If both bodies are rigid bodies, we can apply to the second body B all the experiences which we have gathered in connection with the first, more convenient, and more easily transportable, standard body A. We shall revert later to the circumstance that it is neither necessary nor possible to employ a special body of comparison, or standard, for every body. The most convenient bodies of comparison, though applicable only after a crude fashion,—bodies whose invariance during transportation we always have before our eyes,—are our *hands* and *feet*, our *arms* and *legs*. The names of the oldest measures show distinctly that originally we made our measurements with hand-breadths, forearms (*ells*), feet (*paces*), etc. Nothing but a period of *greater exactitude* in measurement began with the introduction of conventional and carefully preserved physical standards; the principle remains the same. The measure enables us to compare bodies which are difficult to move or practically immovable.

As has been remarked, it is not the *spatial*, but predominantly the *material*, properties of bodies that possess the strongest interest. This fact certainly finds expression even in the beginnings of

geometry. The *volume* of a body is instinctively taken into account as representing the quantity of its material properties, and so comes to form an object of *contention* long before its geometric properties receive anything approaching to profound consideration. It is here, however, that the comparison, the measurement of volumes acquires its initial import, and thus takes its place among the first and most important problems of primitive geometry. The first measurements of volume were doubtless of liquids and fruit, and were made with hollow measures. The object was to ascertain conveniently the quantity of like matter, or the *quantity* (*number*) of homogeneous, similarly-shaped (identical) *bodies*. Thus, conversely, the capacity of a store-room (granary) was in all likelihood originally estimated by the quantity or number of homogeneous bodies which it was capable of containing. The measurement of volume by a unit of volume is in all probability a much later conception, and can only have developed on a higher stage of abstraction. Estimates of areas were also doubtless made from the *number* of fruit-bearing or useful plants which a field would accommodate, or from the quantity of seed that could be sown on it; or possibly also from the *labor* which such work required. The measurement of a surface by a surface was readily and obviously suggested in this connection when fields of the same size and shape lay near one another. There one could scarcely doubt that the field made up of n fields of the same size and form possessed also n-fold agricultural value. We shall not be inclined to underrate the significance of this intellectual step when we consider the errors in the measurement of areas which the Egyptians[1] and even the Roman *agrimensores*[2] commonly committed. Even with a people so splendidly endowed with geometrical talent as the Greeks, and in a late period, we meet with the sporadic expression of the idea that surfaces having equal perimeters were equal in area.[3] When the Persian "Overman," Xerxes,[4] wished to count the army which he had to "feed,"

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[1] Eisenlohr, *Ein mathematisches Handbuch der alten Aegypter: Papyrus Rhind*, Leipsic, 1877.

[2] M. Cantor, *Die römischen Agrimensoren*, Leipsic, 1875.

[3] Thucydides, VI., 1.

[4] Herodotus, VII., 22, 56, 103, 223.

and which he drove under the lash across the Hellespont against the Greeks, he adopted the following procedure: 10,000 men were drawn up closely packed together. The area which they covered was surrounded with an enclosure, and each successive division of the army, or rather, herd of slaves, that was driven into and filled the pen, counted for another 10,000. We meet here with the converse application of the idea by which a surface is measured by the *quantity* (*number*) *of equal, identical, immediately adjacent bodies which cover it.* In abstracting, first instinctively and then consciously, from the height of these bodies, the transition is made to measuring surfaces by means of a unit of surface. The analogous step to measuring volumes by volume demands a far more practiced, geometrically schooled intuition. It is effected later and is even at this day less easy to the masses.

The oldest estimates of long *distances,* which were computed by day's journeys, hours of travel, etc., were doubtless based upon the effort, labor, and expenditure of time necessary for covering these distances. But when lengths are measured by the repeated application of the hand, the foot, the arm, the rod, or the chain, then, accurately viewed, the measurement is made by the enumeration of like bodies, and we have again really a measurement of volume. The singularity of this conception will disappear in the course of this exposition. If, now, we abstract, first instinctively and then consciously, from the two transverse dimensions of the bodies employed in the enumeration, we reach the measuring of a line by a line.

A surface is commonly defined as the boundary of a space. Thus, the surface of a metal sphere is the boundary between the metal and the air; it is not part either of the metal or of the air; two dimensions only are ascribed to it. Analogously, the one-dimensional line is the boundary of a surface; for example, the equator is the boundary of the surface of a hemisphere. The dimensionless point is the boundary of a line; for example, of the arc of a circle. A point, by its motion, generates a one-dimensional line, a line a two-dimensional surface, and a surface a three-dimensional solid space. No difficulties are presented by this concept to minds at

all skilled in abstraction. It suffers, however, from the drawback that it does not exhibit, but on the contrary artificially conceals, the natural and actual way in which the abstractions have been reached. A certain discomfort is therefore felt when the attempt is made from this point of view to define the measure of surface or unit of area after the measurement of lengths has been discussed.[1]

A more homogeneous conception is reached if *every* measurement be regarded as a counting of space by means of immediately *adjacent*, spatially *identical*, or at least hypothetically identical, *bodies*, whether we be concerned with volumes, with surfaces, or with lines. Surfaces may be regarded as corporeal sheets, having everywhere the same constant thickness which we may make small at will, *vanishingly* small; lines, as strings or threads of constant, vanishingly small thickness. A point then becomes a small corporeal space from the extension of which we purposely abstract, whether it be part of another space, of a surface, or of a line. The bodies employed in the enumeration may be of any smallness or any form which conforms to our needs. Nothing prevents our idealising in the usual manner these images, reached in the natural way indicated, by simply leaving out of account the thickness of the sheets and the threads. The usual and somewhat timid mode of presenting the fundamental notions of geometry is doubtless due to the fact that the infinitesimal method which freed mathematics from the historical and accidental shackles of its early elementary form, did not begin to influence geometry until a later period of development, and that the frank and natural alliance of geometry with the *physical* sciences was not restored until still later, through Gauss. But why the elements shall not now partake of the advantages of our better insight, is not to be clearly seen. Even Leibnitz adverted to the fact that it would be more rational to begin with the *solid* in our geometrical definitions.[2]

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[1] Hölder, *Anschauung und Denken in der Geometrie*, Leipsic, 1900, p. 18. W. Killing, *Einführung in die Grundlagen der Geometrie*, Paderborn, 1898, II., p. 22, et seq.

[2] Letter to Vitale Giordano, *Leibnizens mathematische Schriften*, edited by Gerhardt, Section I., Vol. I., page 199.

The measurement of spaces, surfaces, and lines by means of *solids* is a conception from which our refined geometrical methods have become entirely estranged. Yet this idea is not merely the forerunner of the present idealised methods, but it plays an important part in the psychology of geometry, and we find it still powerfully active at a late period of development in the workshop of the investigator and inventor in this domain. Cavalieri's Method of Indivisibles appears best comprehensible through this idea. Taking his own illustration, let us consider the surfaces to be compared (the quadratures) as covered with equidistant parallel threads of any number we will, after the manner of the warp of woven fabrics, and the spaces to be compared (the cubatures) as filled with parallel sheets of paper. The total *length* of the threads may then serve as measure of the *surfaces*, and the total *area* of the sheets as measure of the *volumes*, and the accuracy of the measurement may be carried to any point we wish. The number of *like equidistant* bodies, if close enough together and of the right form, can just as well furnish the numerical measures of surfaces and solid spaces as the number of identical bodies absolutely covering the surfaces or absolutely filling the spaces. If we cause these bodies to shrink until they become lines (straight lines) or until they become surfaces (planes), we shall obtain the division of surfaces into surface-elements and of spaces into space-elements, and coincidently the customary measurement of surfaces by surfaces and of spaces by spaces. Cavalieri's defective exposition, which was not adapted to the state of the geometry of his time, has evoked from the historians of geometry some very harsh criticisms of his beautiful and prolific procedure.[1] The fact that a Helmholtz, his critical judgment yielding in an unguarded moment to his fancy, could, in his great youthful work,[2] regard a surface as the sum of the lines (ordinates) contained in it, is merely proof of the great depth to which

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[1] Weissenborn, *Principien der höheren Analysis in ihrer Entwickelung*. Halle, 1856. Gerhardt, *Entdeckung der Analysis*. Halle, 1855, p. 18. Cantor, *Geschichte der Mathematik*. Leipsic, 1892, II. Bd.

[2] Helmholtz, *Erhaltung der Kraft*. Berlin, 1847, p. 14.

this original natural conception reaches, and of the facility with which it reasserts itself.[1]

II.

We have then, first, the general experience that *moveable bodies* exist, to which, in spite of their mobility, a certain *spatial constancy* in the sense above described, a permanently *identical property*, must be attributed,—a property which constitutes the foundation of all notions of measurement. But in addition to this there has been gathered instinctively, in the pursuit of the trades and the arts, a considerable variety of *special* experiences, which have contributed their share to the development of geometry. Appearing in part in unexpected form, in part harmonising with one another, and sometimes, when incautiously applied, even becoming involved in what appears to be paradoxical contradictions, these experiences disturb the course of thought and incite it to the pursuit of the or-

[1] The following simple illustration (Fig. 1) of Cavalieri's method may be helpful to readers not thoroughly conversant with geometry: Imagine a right circular cylinder of horizontal base cut out of a stack of paper sheets resting on a table, and conceive inscribed in the cylinder a cone of the same base and altitude. Whereas the sheets cut out by the cylinder are all equal, those forming the cone increase in size as the squares of their distances from the vertex. Now from elementary geometry we know that the volume of such a cone is one third that of the cylinder. This result may be applied at once to the quadrature of the parabola. Let a rectangle be described about a portion of a parabola, its sides coinciding with the axis and the tangent to the curve at the origin. Conceiving the rectangle to be covered with a system of threads running parallel to x, every thread of the rectangle will be divided into two parts, of which that lying outside the parabola is proportional to y^2. Therefore, the area outside the parabola is to the total area of the rectangle precisely as is the *volume* of the cone to that of the cylinder, viz., as 1 is to 3.

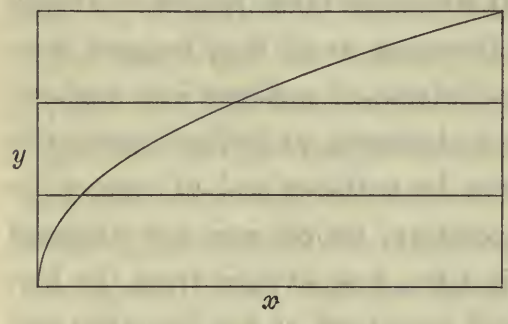

Fig. 1.

It is significant of the naturalness of Cavalieri's view that the writer of these lines, hearing of the higher geometry when a student at the Gymnasium, but without any training in it, lighted on very similar conceptions,—a performance not attended with any difficulty in the nineteenth century. By the aid of these he made a number of little discoveries, which were of course already long known, found Guldin's theorem, calculated some of Kepler's solids of rotation, etc.

derly logical connection of these experiences. We shall now devote our attention to some of these processes.

* * *

Even though the well-known statement of Herodotus[1] were wanting, in which he ascribes the origin of geometry to land-surveying among the Egyptians; and even though the account were totally lost[2] which Eudemus has left regarding the early history of geometry, and which is known to us from an extract in Proclus, it would be impossible for us to doubt that a pre-scientific period of geometry existed. The first geometrical knowledge was acquired accidentally and without design in the way of practical experience, in connection with the most varied employments. It was gained at a time when the scientific spirit, or interest in the interconnection of the experiences in question, was but little developed. This is plain even in our meager history of the beginnings of geometry, but still more so in the history of primitive civilisation at large, where technical geometrical appliances are known to have existed at so early and barbaric a day as to exclude absolutely the assumption of scientific effort.

All savage tribes practice the art of weaving, and here, as in their drawing, painting, and wood-cutting, occur preferably ornamental themes consisting of the simplest geometrical forms. For such forms, like the drawings of our children, answer to the simplified, typical, schematic conception of the objects which they are

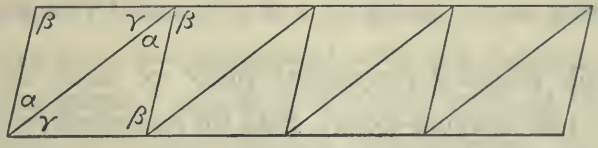

Fig. 2.

desirous of imitating, while it is also these forms which are most easily produced, with their primitive implements and manual dexterity. Such an ornament consisting of a series of similarly-shaped triangles alternately inverted, or of a series of parallelograms (Fig. 2), clearly suggests the idea, that the sum of the three angles

[1] *Herodotus*, II., 109.

[2] James Gow, *A Short History of Greek Mathematics*, Cambridge, 1884, p. 134.

of a triangle, when their vertices are placed together, makes up two right angles. Also this fact could not possibly have escaped the clay and stone workers of Assyria, Egypt, Greece, etc., in constructing the customary mosaics and pavements from differently colored stones of the same shape. The theorem of the Pythagoreans that the plane space about a point can be completely filled by only three regular polygons, viz., by six equilateral triangles, by four squares, and by three regular hexagons, points to the same source.[1] A like origin is revealed also in the early Greek method of demonstrating the theorem regarding the angle-sum of any triangle by dividing it (by drawing the altitude) into two right-angled triangles and completing the rectangles corresponding to the parts so obtained.[2] The same experiences happen on many other occasions. If

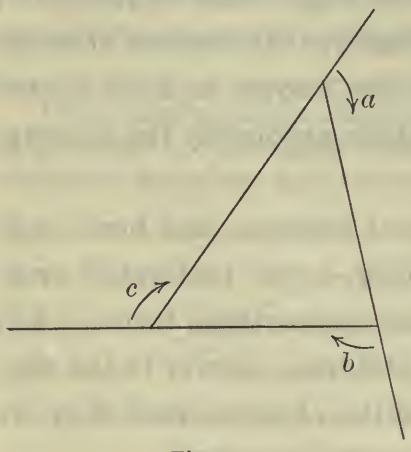

Fig. 3.

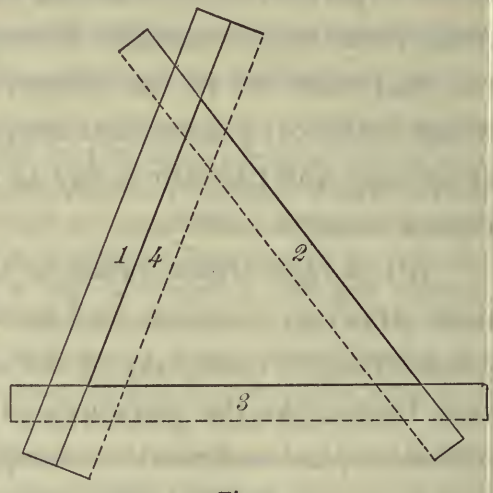

Fig. 4.

a surveyor walk round a polygonal piece of land, he will observe, on arriving at the starting-point, that he has performed a complete revolution, consisting of four right angles. In the case of a triangle, accordingly, of the six right angles constituting the interior and exterior angles (Fig. 3) there will remain, after subtracting the three exterior angles of revolution, *a*, *b*, *c*, two right angles as the sum of the interior angles. This deduction of the theorem was

[1] This theorem is attributed to the Pythagoreans by Proclus. Cf. Gow, *A Short History of Greek Mathematics*, p. 143, footnote.

[2] Hankel, *Geschichte der Mathematik*, Leipsic, 1874, p. 96.

employed by Thibaut,[1] a contemporary of Gauss. If a draughtsman draw a triangle by successively turning his ruler round the interior angles, always in the same direction (Fig. 4), he will find on reaching the first side again that if the edge of his ruler lay toward the outside of the triangle on starting, it will now lie toward the inside. In this procedure the ruler has swept out the interior angles of the triangle in the same direction, and in doing so has performed half a revolution.[2] Tylor[3] remarks that cloth or paper-folding may have led to the same results. If we fold a triangular piece of paper in the manner shown in Fig. 5, we shall obtain a double rectangle, equal in area to one half the triangle, where it will be seen that the sum of the angles of the triangle coinciding at *a* is two right angles. Although some very astonishing results may be obtained by paper-folding,[4] it can scarcely be assumed that these processes were *historically* very productive for geometry. The material is of too limited application, and artisans employed with it have too little incentive to exact observation.

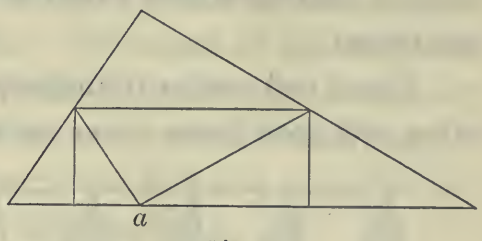

Fig. 5.

The knowledge that the angle-sum of the plane triangle is equal to a *determinate quantity*, namely, to two right angles, has thus been reached by experience, not otherwise than the law of the lever and Boyle and Mariotte's law of gases. It is true that neither the unaided eye nor measurements with the most delicate instruments can demonstrate *absolutely* that the sum of the angles of a plane triangle is *exactly* equal to two right angles. But the case is precisely the same with the law of the lever and with Boyle's law.

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[1] Thibaut, *Grundriss der reinen Mathematik*, Göttingen, 1809, p. 177. The objections which may be raised to this and the following deductions will be considered later.

[2] Noticed by the writer of this article while drawing.

[3] Tylor, *Anthropology, An Introduction to the Study of Man*, etc., German trans., Brunswick, 1883, p. 383.

[4] See, for example, Sundara Row's *Geometric Exercises in Paper-Folding*. Chicago: The Open Court Publishing Co. 1901.—*Tr.*

All these theorems are therefore idealised and schematised experiences; for real measurements will always show slight deviations from them. But whereas the law of gases has been proved by further experimentation to be approximate only and to stand in need of modification when the facts are to be represented with great exactness, the law of the lever and the theorem regarding the angle-sum of a triangle have remained in as exact accord with the facts as the inevitable errors of experimenting would lead us to expect; and the same statement may be made of all the consequences that have been based on these two laws as preliminary assumptions.

Equal and similar triangles placed in paving alongside one another with their bases *in one and the same straight line* must also have led to a very important piece of geometrical knowledge. (Fig. 6.)

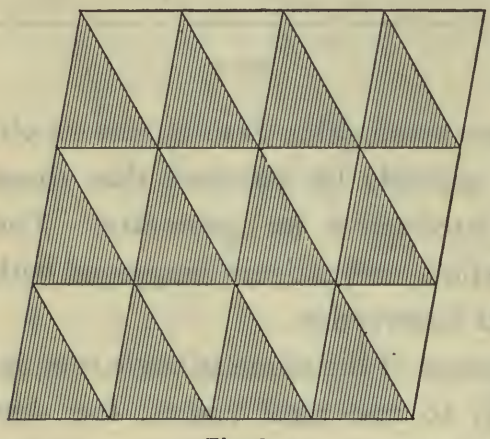

Fig. 6.

If a triangle be displaced in a plane along a straight line (without rotation), all its points, including those of its bounding lines, will describe equal paths. The same bounding line will furnish, therefore, in any two different positions, a system of two straight lines *equally distant* from one another at all points, and the operation coincidently vouches for the equality of the angles made by the line of displacement on corresponding sides of the two straight lines. The sum of the interior angles on the same side of the line of displacement was consequently determined to be two right angles, and thus Euclid's theorem of parallels was reached. We may add that the possibility of extending a pavement of this kind indefinitely, necessarily lent increased obviousness to this discovery. The sliding of a triangle along a ruler has remained to this day the simplest and most natural method of drawing parallel lines. It is scarcely necessary to remark that the theorem of parallels and the theorem of the angle-sum of a triangle are inseparably con-

nected and represent merely different aspects of the same experience.

The stone masons above referred to must have readily made the discovery that a regular hexagon can be composed of equilateral triangles. Thus resulted immediately the simplest instances of the division of a circle into parts,—namely its division into six parts by the radius, its division into three parts, etc. Every carpenter knows instinctively and almost without reflection that a beam of rectangular symmetric cross-section may, owing to the perfect symmetry of the circle, be cut out from a cylindrical tree-trunk in an infinite number of different ways. The edges of the beam will all lie in the cylindrical surface, and the diagonals of a section will pass through the center. It was in this manner, according to Hankel[1] and Tylor,[2] that the discovery was probably made that all angles inscribed in a semicircle are right angles.

A stretched thread furnishes the distinguishing *visualisation* of the *straight line*. The straight line is characterised by its physiological simplicity. All its parts induce the *same* sensation of direction; every point evokes the mean of the space-sensations of the neighboring points; every part, however small, is similar to every other part, however great. But, though it has influenced the definitions of many writers,[3] the geometer can accomplish little with this physiological characterisation. The visual image must be enriched by physical experience concerning corporeal objects to be geometrically available. Let a string be fastened by one extremity at A, and let its other extremity be passed through a ring fastened at B. If we pull on the extremity at B, we shall *see* parts of the string which before lay between A and B pass out at B, while at the same time the string will approach the form of a straight line. A smaller number of like parts of the string, *identical bodies*, suffices to compose the straight line joining A and B than to compose a curved line. It is erroneous to assert that the straight line is recognised as the shortest line *by mere visualisation*. It is quite true we can, so far as quality is concerned, reproduce in *imagination* with perfect

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[1] *Loc. cit.*, pp. 206–207. [2] *Loc. cit.* [3] Euclid, *Elements*, I., Definition 3.

accuracy and reliability, the simultaneous change of form and length which the string undergoes. But this is nothing more than a reviviscence of a *prior experience with bodies,—an experiment in thought.* The mere *passive contemplation of space* would never lead to such a result. Measurement is experience involving a physical reaction, a superposition-experiment. Visualised or imagined lines having different directions and lengths cannot be applied to one another forthwith. The possibility of such a procedure must be actually experienced with material objects accounted as unalterable. It is erroneous to attribute to animals an instinctive knowledge of the straight line as the shortest distance between two points. If a stimulus attract an animal's attention, and if the animal has so turned that its plane of symmetry passes through the stimulating object, then the straight line is the path of motion *uniquely* determined by the stimulus. This is distinctly shown in Loeb's investigations on the tropisms of animals.

Further, visualisation alone does not prove that any two sides of a triangle are together greater than the third side. It is true that if the two sides be laid upon the base by rotation round the vertices of the basal angles, it will be seen by an act of *imagination* alone that the two sides with their free ends moving in arcs of circles will ultimately overlap, thus more than filling up the base. But we should not have attained to this representation had not the procedure been actually witnessed in connection with corporeal objects. Euclid[1] deduces this truth circuitously and artificially from the fact that the greater side of every triangle is opposite to the greater angle. But the source of our knowledge here also is experience,—experience of the motion of the side of a physical triangle; this source has, however, been laboriously concealed by the form of the deduction,—and this not to the enhancement of perspicuity and brevity.

But the properties of the straight line are not exhausted with the preceding empirical truths. If a wire of any arbitrary shape be laid on a board in contact with two upright nails, and slid along

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[1] Euclid, *Elements*, Book I., Prop. 20.

so as to be always in contact with the nails, the form and position of the parts of the wire between the nails will be constantly changing. The straighter the wire is, the slighter the alteration will be. A straight wire submitted to the same operation slides *in itself*. Rotated round two of its own fixed points, a crooked wire will keep constantly changing its position, but a straight wire will maintain its position, it will rotate within itself.[1] When we define, now, a straight line as the line which is completely determined by two of its points, there is nothing in this *concept* except the *idealisation* of the empirical notion derived from the physical experience mentioned,—a notion by no means directly furnished by the physiological act of visualisation.

The plane, like the straight line, is physiologically characterised by its simplicity. It appears the same at all parts.[2] Every point evokes the mean of the space-sensations of the neighboring points. Every part, however small, is like every other part, however great. But experiences gained in connection with physical objects are also required, if these properties are to be put to geometrical account. The plane, like the straight line, is physiologically symmetrical with respect to itself, if it coincides with the median plane of the body or stands at right angles to the same. But to discover that symmetry is a *permanent* geometrical property of the plane and the straight line, both constructs must be given as moveable, unalterable physical objects. The connection of physiological symmetry with metrical properties is in need also of special metrical demonstration.

Physically a plane is constructed by rubbing three bodies together until three surfaces, *A*, *B*, *C*, are obtained, each of which exactly fits the others,—a result which can be accomplished, as Fig. 7 shows, with neither convex nor concave surfaces, but with

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[1] In a letter to Vitale Giordano (*Leibnizens mathematische Schriften, herausgegeben v. Gerhardt, erste Abtheilung, Bd. I., S.* 195-196), Leibnitz makes use of the above-mentioned property of a straight line for its definition. The straight line shares the property of displaceability in itself with the circle and the circular cylindrical spiral. But the property of rotatability within itself and that of being determined by *two* points, are exclusively its own.

[2] Compare Euclid, *Elements* I., Definition 7.

plane surfaces only. The convexities and concavities are, in fact, removed by the rubbing. Similarly, a truer straight line can be obtained with the aid of an imperfect ruler, by first placing it with its ends against the points *A*, *B*, then turning it through an angle of 180° out of its plane and again placing it against *A*, *B*, afterwards taking the *mean* between the two lines so obtained as a more perfect straight line, and repeating the operation with the line last obtained. Having produced by rubbing, a plane, that is to say, a surface having the same form at *all points* and on *both* sides, experience furnishes additional results. Placing two such planes one on the other, it will be learned that the plane is *displaceable* into itself, and *rotatable* within itself, just as a straight line is. A thread stretched between any two points in the plane falls entirely within the plane. A piece of cloth drawn tight across any bounded portion of a plane coincides with it. Hence the plane represents the minimum of surface within its boundaries. If the plane be laid on two sharp points, it can still be rotated around the straight line joining the points, but any third point outside of this straight line fixes the plane, that is, determines it completely.

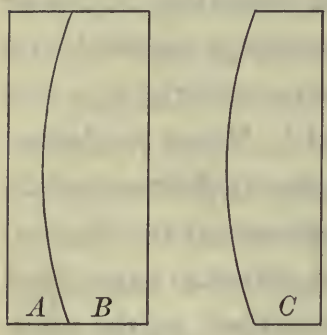

Fig. 7.

In the letter to Vitale Giordano, above referred to, Leibnitz makes the frankest use of this experience with corporeal objects, when he defines a plane as a surface which divides an unbounded solid into two congruent parts, and a straight line as a line which divides an unbounded plane into two congruent parts.[1]

If attention be directed to the symmetry of the plane with respect to itself, and two points be assumed, one on each side of it, each symmetrical to the other, it will be found that every point in

[1] The passage reads literally: "Et difficulter absolvi poterit demonstratio, nisi quis assumat notionem rectæ, qualis est qua ego uti soleo, quod corpore aliquo duobus punctis immotis revoluto locus omniom punctorum quiescentium sit recta, vel saltem quod recta sit linea secans planum interminatum in duas partes congruas; et planum sit superficies secans solidum interminatum in duas partes congruas." For similar definitions, see, for example, Halsted's *Elements of Geometry*, 6th edition. New York, 1895, p. 9.—*T. J. McC.*

the plane is equidistant from these two points, and Leibnitz's definition of the plane is reached.[1] The uniformity and symmetry of the straight line and the plane are consequences of their being *absolute* minima of length and area respectively. For the boundaries given the minimum must exist, no other collateral condition being involved. The minimum is unique, *single in its kind;* hence the *symmetry* with respect to the bounding points. Owing to the *absoluteness* of the minimum, every portion, however small, again exhibits the same minimal property; hence the uniformity.

Empirical truths organically connected may make their appearance independently of one another, and doubtless were so discovered long before the fact of their connection was known. But this does not preclude their being afterwards recognised as involved in, and *determined* by, one another, as being *deducible* from one another. For example, supposing we are acquainted with the symmetry and uniformity of the straight line and the plane, we easily deduce that the intersection of two planes is a *straight line*, that any two points of the plane can be joined by a straight line lying wholly within the plane, etc. The fact that only a *minimum* of inconspicuous and unobtrusive experiences is requisite for such deductions should not lure us into the error of regarding this minimum as wholly superfluous, and of believing that visualisation and reasoning are alone sufficient for the construction of geometry.

Like the concrete visual images of the straight line and the plane, so also our visualisations of the circle, the sphere, the cylinder, etc., are enriched by metrical experiences, and in this manner first rendered amenable to fruitful geometrical treatment. The same economic impulse that prompts our children to retain only the *typical* features in their concepts and drawings, leads us also to the *schematisation* and conceptual *idealisation* of the images derived from our experience. Although we never come across in nature a perfect straight line or an exact circle, in our thinking we nevertheless designedly abstract from the deviations which thus

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[1] Leibnitz, *in re* "geometrical characteristic," letter to Huygens, Sept. 8, 1679 (Gerhardt, *loc. cit.*, *erste Abth.*, *Bd. II.*, *S.* 23).

occur. Geometry, therefore, is concerned with *ideal objects* produced by schematisation of *experiential objects*. I have remarked elsewhere that it is wrong in elementary geometrical instruction to cultivate predominantly the logical side of the subject, and to neglect to throw open to young students the wells of knowledge contained in experience. It is gratifying to note that the Americans, who are less dominated than we by tradition, have recently broken with this system and are introducing a sort of experimental geometry as introductory to systematic geometric instruction.[1]

III.

No sharp line can be drawn between the instinctive, the technical, and the scientific acquisition of geometric notions. Generally speaking, we may perhaps say that with the division of labor in the industrial and economic fields, with increasing employment with specific objects, the instinctive acquisition of knowledge falls into the background, and the technical begins. Finally, *when measurement becomes an aim and profession in itself*, the *connection* obtaining between the various operations of measuring acquires a powerful *economic* interest, and we reach the period of the scientific development of geometry, to which we now proceed.

The knowledge that the measures of geometry depend on one another, was reached in divers ways. After surfaces came to be measured by surfaces, certain other progress was almost inevitable. In a parallelogrammatic field permitting of division into equal partial parallelogrammatic fields so that n rows of partial fields each containing m fields lay alongside one another, the counting of these fields was unnecessary. By multiplying together the numbers measuring the sides, the area of the field was found to be equal to mn such fields, and the area of each of the two triangles formed by drawing the diagonal was readily discovered to be equal

[1] W. T. Campbell, *Observational Geometry*, New York, 1899; W. W. Spear, *Advanced Arithmetic*, Boston, 1899. [See also Hanus, *Geometry in the Grammar School*, Boston, 1898, and the recommendations of the Harvard Catalogue for 1901–1902, p. 307.—*Tr.*]

to $\frac{mn}{2}$ such fields. This was the first and simplest application of arithmetic to geometry. Coincidently, the dependence of measures of area on other measures, linear and angular, was discovered. The area of a rectangle was found to be larger than that of an oblique parallelogram having sides of the same length; the area, consequently, depended not only on the length of the sides, but also on the angles. On the other hand, a rectangle constructed of strips of wood running parallel to the base, can, as is easily seen, be converted by displacement into any parallelogram of the same height and base without altering its area. Quadrilaterals having their sides given are still undetermined in their angles, as every carpenter knows. He adds diagonals, and converts his quadrilateral into triangles, which, the sides being given, are rigid, that is to say, are unalterable as to their angles also. With the perception that measures were dependent on one another, the real problem of geometry was introduced. Steiner has aptly and justly entitled his principal work "Systematic Development of the Dependence of Geometrical Figures on One Another."[1] In Snell's original unappreciated treatise on Elementary Geometry, the problem in question is made obvious even to the beginner.[2]

A plane physical triangle is constructed of wires. If one of the sides be rotated around a vertex, so as to increase the interior angle at that point, the side moved will be seen to change its position and the side opposite to grow *larger* with the angle. *New* pieces of wire besides those before present will be required to complete the last-mentioned side. This and other similar experiments can be repeated in thought, but the mental experiment is never anything more than a copy of the physical experiment. The mental experiment would be impossible if physical experience had not antecedently led us to a knowledge of *spatially unalterable physical bodies*,[3]—to the concept of measure. By experiences of this char-

[1] J. Steiner, *Systematische Entwicklung der Abhängigkeit der geometrischen Gestalten von einander.*

[2] Snell, *Lehrbuch der Geometrie*, Leipsic, 1869.

[3] The entire construction of the Euclidean geometry shows traces of this foundation. It is still more conspicuous in the "geometric characteristic" of Leibnitz already mentioned. We shall revert to this topic later.

acter, we are conducted to the truth that of the six metrical magnitudes discoverable in a triangle (three sides and three angles) three, including at least *one* side, suffice to determine the triangle. If *one* angle only be given among the parts determining the triangle, the angle in question must be either the angle included by the given sides, or that which is opposite to the greater side,—at least if the determination is to be *unique*. Having reached the perception that a triangle is determined by three sides and that its form is independent of its position, it follows that in an equilateral triangle all three angles and in an isosceles triangle the two angles opposite the equal sides, must be equal, in whatever manner the angles and sides may depend on one another. This is logically certain. But the empirical foundation on which it rests is for that reason not a whit more superfluous than it is in the analogous cases of physics.

The mode in which the sides and angles depend on one another is first recognised, naturally, in special instances. In computing the areas of rectangles and of the triangles formed by their diagonals, the fact must have been noticed that a rectangle having sides 3 and 4 units in length gives a right-angled triangle having sides, 3, 4, and 5 units in length. Rectangularity was thus shown to be connected with a definite, rational ratio between the sides. The knowledge of this truth was employed to stake off right angles, by means of three connected ropes respectively 3, 4, and 5 units in length.[1] The equation $3^2+4^2=5^2$, the analogue of which was proved to be valid for all right-angled triangles having sides of length a, b, c (the general formula being $a^2+b^2=c^2$), now riveted the attention. It is well known how profoundly this relation enters into metrical geometry, and how all indirect measurements of distance may be traced back to it. We shall endeavor to disclose the foundation of this relation.

It is to be remarked first that neither the Greek geometrical nor the Hindu arithmetical deductions of the so-called *Pythagorean Theorem* could avoid the consideration of areas. One essential

[1] Cantor, *Geschichte der Mathematik*, Leipsic, 1880. I., pp. 53, 56.

point on which all the deductions rest and which appears more or less distinctly in different forms in all of them, is the following: If a triangle, *a*, *b*, *c* (Fig. 8) be slid along a short distance in its own

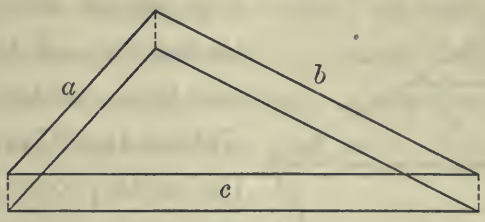

Fig. 8.

plane, it is assumed that the space which it leaves behind is made up for, or compensated for, by the new space on which it enters. That is to say, the area swept out by *two* of the sides during the displacement is equal to the area swept out by the *third* side. The basis of this conception is the assumption of the *conservation of the area* of the triangle. If we consider a surface as a body of very minute but unvarying thickness of third dimension (which for that reason is uninfluential in the present connection), we shall again have the *conservation of the volume of bodies* as our fundamental assumption. The same conception may be applied to the translation of a tetrahedron, but it does not lead in this instance to new points of view. Conservation of volume is a property which rigid and liquid bodies possess in common and was idealised by the old physics as *impenetrability*. In the case of rigid bodies, we have the additional attribute that the distances between all the parts are preserved, while in the case of liquids, the properties of rigid bodies exist only for the smallest time and space elements.

If an oblique-angled triangle having the sides *a*, *b*, and *c* be displaced in the direction of the side *b*, only *a* and *c* will, by the principle above stated, describe equivalent parallelograms, which are alike in an equal pair of parallel sides on the same parallels. If *a* make with *b* a right angle, and the triangle be displaced at right angles to *c*, the distance *c*, the side *c* will describe the square c^2, while the two other sides will describe parallelograms the combined areas of which are equal to the area of the square. The two parallelograms are, by the observation which just precedes, equivalent respectively to a^2 and b^2,—and with this the Pythagorean the-

orem is reached. The same result may also be attained (Fig. 9) by first sliding the triangle a distance a at right angles to a, and then a distance b at right angles to b, where $a^2 + b^2$ will be equal to the sum of the surfaces swept out by c, which is obviously c^2. Taking an oblique-angled triangle, the same procedure just as easily and obviously gives the more general proposition, $c^2 = a^2 + b^2 - 2ab\cos\gamma$.

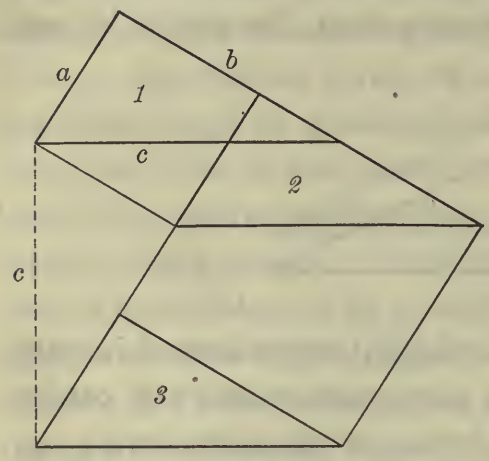

Fig. 9.

The dependence of the third side of the triangle on the two other sides is accordingly determined by the area of the enclosed triangle; or, in our conception, by a condition involving *volume*. It will also be directly seen that the equations in question express relations of area. It is true that the angle included between two of the sides may also be regarded as determinative of the third side, in which case the equations will apparently assume an entirely different form. Let us look a little more closely at these different measures. If the extremities of two straight lines of lengths a and b meet in a point, the length of the line c joining their free extremities will be included between definite limits. We shall have $c \lesseqgtr a + b$, and $c \gtreqless a - b$. Visualisation alone cannot inform us of this fact; we can learn it only from *experimenting in thought*,—a procedure which reposes on physical experience and reproduces it. This will be seen by holding a fast, for example, and turning b, first, until it forms the prolongation of a, and, secondly, until it coincides with a. A straight line is primarily a unique concrete image characterised by physiological properties,—an image which we have obtained from a *physical* body of a definite specific character, which in the form of a string or wire of indefinitely small but constant thickness interposes a *minimum of volume* between the positions of its extremities,—which can be accomplished only in *one uniquely-determined* manner. If several straight lines pass through a point, we distinguish between them *physiologically* by their direc-

tions. But in *abstract space* obtained by metrical experiences with physical objects, differences of direction do not exist. A straight line passing through a point can be completely determined in abstract space only by assigning a second *physical* point on it. To define a straight line as a line which is constant in direction, or an angle as a *difference between directions*, or parallel straight lines as straight lines having the *same* direction, is to define these concepts *physiologically*.

Different methods are at our disposal when we come to characterise or determine *geometrically* angles which are *visually* given. An angle is determined when the distance is assigned between any two fixed points lying each on a separate side of the angle outside the point of intersection. To render the definition uniform, points situated at the same fixed and invariable distance from the vertex might be chosen. The inconvenience that then equimultiples of a given angle placed alongside one another in the same plane with their vertices coincident, would not be measured by the same equimultiples of the distance between those points, is the reason that this method of determining angles was not introduced into elementary geometry.[1] A simpler measure, a simpler characterisation of an angle, is obtained by taking the aliquot part of the *circumference* or the *area* of a circle which the angle intercepts when laid in the plane of the circle with its vertex at the center. The convention here involved is more convenient.[2]

In employing an arc of a circle to determine an angle, we are again merely measuring a volume,—viz., the volume occupied by a body of simple definite form introduced between two points on the arms of the angle equidistant from the vertex. But a circle can be characterised by simple rectilinear distances. It is a matter of perspicuity, immediacy, and of the facility and convenience resulting therefrom, that two measures, viz., the rectilinear measure of length and the angular measure, are principally employed as

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[1] A closely allied principle of measurement is, however, applied in trigonometry.

[2] So also the superficial portion of a sphere intercepted by the including planes is used as the measure of a solid angle.

fundamental measures, and the others derived from them. It is in no sense necessary. For example (Fig. 10), it is possible without a special angular measure to determine the straight line that cuts another straight line at right angles by making all its points equidistant from two points in the first straight line lying at equal distances from the point of intersection. The bisector of an angle can be determined in a quite similar manner, and by continued bisection an angular unit can be derived of any smallness we wish. A straight line *parallel* to another straight line can be defined as one, all of whose points can be translated by congruent curved or *straight* paths into points of the first straight line.[1] It is quite possible to start with the straight length *alone* as our fundamental measure. Let a fixed physical point a be given. Another point, m, has the distance r_a from the first point. Then this last point can still lie in any part of the spherical surface described about a with radius r_a. If we know still a second fixed point b, from which m is removed by the distance r_b, the triangle abm will be rigid, determined; but m can still revolve round in the circle described by the rotation of the triangle around the axis ab. If now the point m be held fast in any position, then also the whole rigid body to which the three points in question, a, b, m, belong will be fixed.

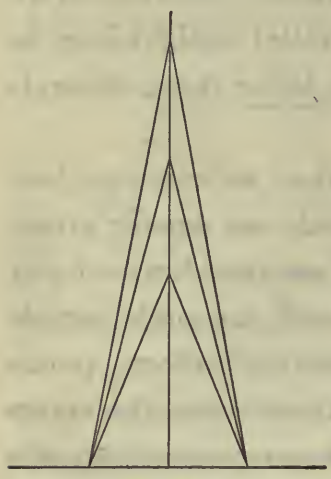

Fig. 10.

A point m is spatially determined, accordingly, by the distances r_a, r_b, r_c from at least three fixed points in space, a, b, c. But this determination is still not unique, for the pyramid with the edges r_a, r_b, r_c, in the vertex of which m lies, can be constructed as well on the one as on the other side of the plane a, b, c. If we were to fix the side, say by a special sign, we should be resorting to a *physiological* determination, for *geometrically* the two sides of the plane are not different. If the point m is to be uniquely deter-

[1] If this form had been adopted, the doubts as to the Euclidean theorem of parallels would probably have risen much later.

mined, its distance, r_d, from a fourth point, d, lying *outside* the plane abc, must be given in addition. Another point, m', is determined with like completeness by four distances, r'_a, r'_b, r'_c, r'_d. Hence, the distance of m from m' is also given by this determination. And the same holds true of any number of other points as severally determined by four distances. Between four points $\frac{4(4-1)}{1\cdot 2} = 6$ distances are conceivable, and precisely this number must be given to determine the form of the point complex. For $4+z=n$ points, $6+4z$ or $4n-10$ distances are needed for the determination, while a still larger number, viz., $n\left(\frac{n-1}{1\cdot 2}\right)$ distances exist, so that the excess of the distances is also coincidently determined.

If we start from *three* points and prescribe that the distances of all points to be further determined shall hold for one side only of the plane determined by the three points, then $3n-6$ distances will suffice to determine the form, magnitude, and position of a system of n points with respect to the three initial points. But if there be no condition as to the side of the plane to be taken,—a condition which involves sensuous and physiological, but not abstract metrical characteristics,—the system of points, instead of the intended form and position, may assume that symmetrical to the first, or be combined of the points of both. *Symmetric* geometrical figures are, owing to our symmetric *physiological organisation*, very easily taken for the same, whereas *metrically* and *physically* they are entirely different. A screw with its spiral winding to the right and one with its spiral winding to the left, two bodies rotating in contrary directions, etc., appear very much alike to the eye. But we are for this reason not permitted to regard them as geometrically or physically equivalent. Attention to this fact would avert many paradoxical questions. Think only of the trouble that such problems gave Kant! Sensuous physiological attributes are determined by relationship to *our body*, to a corporeal system of *specific* constitution; while metrical attributes are determined by relations to the world of physical bodies *at large*. The latter can be ascertained only by experiments of coincidence,—by measurements.

As we see, every geometrical measurement is at bottom reducible to measurements of *volumes*, to the *numeration of bodies*. Measurements of lengths, like measurements of areas, repose on the comparison of the volumes of very thin strings, sticks, and leaves of constant thickness. This is not at variance with the fact that measures of area may be *arithmetically* derived from measures of length, or solid measures from measures of length alone, or from these in combination with measures of area. This is merely proof that *different* measures of volume are dependent on one another. To ascertain the forms of this interdependence is the *fundamental object of geometry*, as it is the province of arithmetic to ascertain the manner in which the various numerical operations, or ordinating activities of the mind, are connected together.

It is extremely probable that the experiences of the visual sense were the reason for the *rapidity* with which geometry developed. But our great familiarity with the properties of rays of light gained from the present advanced state of optical technique, should not mislead us into regarding our *experiential knowledge of rays of light* as the principal foundation of geometry. Rays of light in dust or smoke-laden air furnish admirable *visualisations* of straight lines. But we can derive the *metrical properties* of straight lines from rays of light just as little as we can derive them from *imaged* straight lines. For this purpose experiences with *physical* objects are absolutely necessary. The *rope-stretching* of the practical geometers is certainly older than the use of the theodolite. But once knowing the physical straight line, the ray of light furnishes a very distinct and handy means of reaching new points of view. A blind man could scarcely have invented modern synthetic geometry. But the oldest and the most powerful of the experiences lying at the basis of geometry are just as accessible to the blind man, through his sense of touch, as they are to the person who can see. Both are acquainted with the spatial *permanency of bodies* despite their *mobility;* both acquire a conception of *volume* by *taking hold* of objects. The creator of primitive geometry disregards, first instinctively and then intentionally and consciously, those physical properties that are unessential for his operations and that for the moment do not

concern him. In this manner, and by gradual growth, the idealised concepts of geometry arise on the basis of experience.

IV.

Our geometrical knowledge is thus derived from various sources. We are *physiologically* acquainted, from direct visual and tactual contact, with many and various spatial forms. With these are associated physical (*metrical*) experiences (involving comparison of the space-sensations evoked by different bodies under the same circumstances), which experiences are in their turn also but the expressions of other relations obtaining between sensations. These diverse orders of experience are so intimately interwoven with one another that they can be separated only by the most thoroughgoing scrutiny and analysis. Hence originate the widely divergent views concerning geometry. Here it is based on pure visualisation (*Anschauung*), there on physical experience, according as the one or the other factor is overrated or disregarded. But both factors entered into the development of geometry and are still active in it to-day; for, as we have seen, geometry by no means exclusively employs purely metrical concepts.

If we were to ask an unbiassed, candid person under what form he pictured space, referred, for example, to the Cartesian system of co-ordinates, he would doubtless say: I have the image of a system of rigid (form-fixed), transparent, penetrable, contiguous cubes, having their bounding surfaces marked only by nebulous visual and tactual percepts,—a species of phantom cubes. Over and through these phantom constructs the real bodies or their phantom counterparts move, conserving their spatial permanency (as above defined), whether we are pursuing practical or theoretical geometry, or phoronomy. Gauss's famous investigation of curved surfaces, for instance, is really concerned with the application of infinitely thin laminate and hence flexible bodies to one another. That diverse orders of experience have co-operated in the formation of the fundamental conceptions under consideration, cannot be gainsaid.

Yet, varied as the special experiences are from which geometry has sprung, they may be reduced to a minimum of facts: Movable bodies exist having definite spatial permanency,—viz., rigid bodies exist. But the movability is characterised as follows: we draw from a point three lines not all in the same plane but otherwise undetermined. By three movements parallel to these straight lines any point can be reached from any other. Hence, three measurements or dimensions, physiologically and metrically characterised as the simplest, are sufficient for all spatial determinations. These are the fundamental facts.[1]

The physical metrical experiences, like all experiences forming the basis of experimental sciences, are conceptualised,—idealised. The *need* of representing the facts by simple perspicuous concepts under easy logical control, is the reason for this. Absolutely rigid, spatially invariable bodies, perfect straight lines and planes, no more exist than a perfect gas or a perfect liquid. Nevertheless, we work preferably and also more readily with these concepts than with others that conform more closely to the properties of the objects, deferring the consideration of the deviations. *Theoretical* geometry does not even need to consider these deviations, inasmuch as it assumes objects that fulfil the requirements of the theory absolutely, just as theoretical physics does. But in the case of *practical* geometry, where we are concerned with actual objects, we are obliged, as in practical physics, to consider the deviations from the theoretical assumptions. But geometry has the additional advantage that every deviation of its objects from the assumptions of the theory *which may still be detected* can be *removed*; whereas physics for obvious reasons cannot construct more perfect gases than actually exist in nature. For, in the latter case, we are concerned not with a *single* arbitrarily constructible spatial property alone, but with a relation, occurring in nature and independent of our will, between pressure, volume, and temperature.

The choice of the concepts is suggested by the facts; yet, see-

[1] The historical development of this conception will be considered in another place.

ing that this choice is the outcome of our *voluntary* reproduction of the facts in thought, some free scope is left in the matter. The importance of the concepts is estimated by their range of application. This is why the concepts of the straight line and the plane are placed in the foreground, for every geometrical object can be split up with sufficient approximateness into elements bounded by planes and straight lines. The particular properties of the straight line, plane, etc., which we decide to emphasise, are matters of our own free choice, and this truth has found expression in the various definitions that have been given of the same concept.[1]

The fundamental truths of geometry have thus, unquestionably, been derived from physical experience, if only for the reason that our visualisations and sensations of space are absolutely inaccessible to measurement and cannot possibly be made the subject of metrical experience. But it is no less indubitable that when the relations connecting our visualisations of space with the simplest metrical experiences have been made familiar, then geometrical facts can be reproduced with great facility and certainty in the imagination alone,—that is by purely *mental experiment*. The very fact that a continuous change in our space-sensation corresponds to a continuous metrical change in physical bodies, enables us to ascertain by imagination alone the particular metrical elements that depend on one another. Now, if such metrical elements are observed to enter different constructions having different positions in precisely the same manner, then the metrical results will be regarded as *equal*. The case of the isosceles and equilateral triangles, above mentioned, may serve as an example. The *geometric* mental experiment has advantage over the physical, only in the respect that it can be performed with far simpler experiences and with such as have been more easily and almost unconsciously acquired.

Our sensuous imagings and visualisations of space are *qualitative*, not quantitative nor metrical. We derive from them coincidences and differences of extension, but never real magnitudes.

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[1] Compare, for example, the definitions of the straight line given by Euclid and by Archimedes.

Conceive, for example, Fig. 11, a coin rolling clockwise down and around the rim of another fixed coin of the same size, without sliding. Be our imagination as vivid as it will, it is impossible by a pure feat of reproductive imagery alone, to determine here the angle described in a full revolution. But if it be considered that at the beginning of the motion the radii *a*, *a'* lie in one straight line, but that after a *quarter* revolution the radii *b*, *b'* lie in a straight line, it will be seen at once that the radius *a'* now points vertically upwards and has consequently performed *half* a revolution. The *measure* of the revolution is obtained from metrical concepts, which fixate idealised experiences on definite physical objects, but the *direction* of the revolution is retained in the *sensuous* imagination. The metrical concepts simply determine that in equal circles equal angles are subtended by equal arcs, that the radii to the point of contact lie in a straight line, etc.

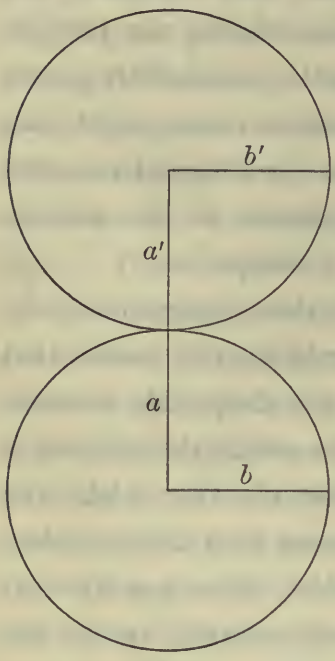

Fig. 11.

If I picture to myself a triangle with one of its angles increasing, I shall also see the side opposite the angle increasing. The impression thus arises that the interdependence in question follows *a priori* from a feat of imagination alone. But the imagination has here merely reproduced a fact of experience. Measure of angle and measure of side are *two physical* concepts applicable to *the same* fact,—concepts that have grown so familiar to us that they have come to be regarded as merely *two* different attributes of the *same* imaged group of facts, and hence appear as linked together of sheer necessity. Yet we should never have acquired these concepts without physical experience. Compare page 496.

The combined action of the sensuous imagination with idealised concepts derived from experience is apparent in every geometrical deduction. Let us consider, for example, the simple theorem that the perpendicular bisectors of the sides of a triangle *ABC* meet in

a common point. Experiment and imagination both doubtless led to the theorem. But the more carefully the construction is executed, the more one becomes convinced that the third perpendicular does not pass exactly through the point of intersection of the first two, and that in any actual construction, therefore, three points of intersection will be found closely adjacent to one another. For in reality neither perfect straight lines nor perfect perpendiculars can be drawn; nor can the latter be erected exactly at the midpoints; and so on. *Only* on the assumption of such *ideal* conditions does the perpendicular bisector of AB contain all points equally distant from A and B, and the perpendicular bisector of BC all points equidistant from B and C. From which it follows that the point of intersection of the two is equidistant from A, B, and C, and by reason of its equidistance from A and C is also a point of the *third* perpendicular bisector, of AC. The theorem asserts therefore that the more accurately the assumptions are fulfilled the more nearly will the three points of intersection coincide.

The importance of the combined action of the sensuous imagination [viz., of the *Anschauung* or intuition so called] and of concepts, will doubtless have been rendered clear by these examples. Kant says: "Thoughts without contents are empty, intuitions without concepts are blind."[1] Possibly we might more appropriately say: "Concepts without intuitions are blind, intuitions without concepts are lame." For it would appear to be not so absolutely correct to call intuitions [viz., sensuous images] blind and concepts empty. When Kant further says that "there is in every branch of natural knowledge only so much science as there is mathematics contained in it,"[2] one might possibly also assert of all sciences *including* mathematics "that they are only in so far sciences as they operate with concepts." For our logical mastery extends only to those concepts of which we have ourselves determined the contents.

The two facts that bodies are rigid and movable would be suf-

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[1] *Kritik der reinen Vernunft*, 1787, p. 75. Max Müller's translation, 2nd ed., 1896, p. 41.

[2] *Metaphysische Anfangsgründe der Naturwissenschaft. Vorwort.*

ficient for an understanding of any geometrical fact, no matter how complicated,—sufficient, that is to say, to derive it from the two facts mentioned. But geometry is obliged, both in its own interests and in its rôle as an auxiliary science, or in the pursuit of practical ends, to answer questions that *recur repeatedly in the same form.* Now it would be uneconomical, in such a contingency, to begin each time with the most elementary facts and to go to the bottom of each new case that presented itself. It is preferable, rather, to select a certain few simple, familiar, and indubitable theorems, in our choice of which caprice is by no means excluded,[1] and to formulate from these, *once for all,* for application to practical ends, general propositions answering the questions that most frequently recur. From this point of view we understand at once the *form* geometry has assumed,—the emphasis, for example, that it lays upon its propositions concerning triangles. For the designated purpose, it is desirable to collect the most general possible propositions, having the widest range of application. From history we know that propositions of this character have been obtained by comprehending various special cases of knowledge under single general cases. We are forced even to-day to resort to this procedure when we treat the relationship of two geometrical figures, or when the different special cases of form and position compel us to modify our modes of deduction. We may cite as the most familiar instance of this in elementary geometry, the mode of deducing the relation obtaining between angles at the centre and angles at the circumference.

Kroman[2] has put the question, Why do we regard a demonstration made with a special figure (a special triangle) as universally valid for all figures? and finds his answer in the supposition that we are able by rapid variations to impart all possible forms to the figure in thought and so convince ourselves of the admissibility of the same mode of inference in all special cases. History and introspection declare this idea to be in all essential respects correct.

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[1] Zindler, *Zur Theorie der mathematischen Erkenntniss. Sitzungsberichte der Wiener Akademie. Philos-histor. Abth.* Bd. 118. 1889.

[2] *Unsere Naturerkenntniss.* Copenhagen, 1883, pp. 74 et seq.

But we may not assume, with Kroman, that in each special case every individual student of geometry acquires this complete synoptic view "with the rapidity of lightning," and attains forthwith to the lucidity and intensity of geometric conviction in question. Frequently the required operation is absolutely impracticable, and errors prove that in other cases it was actually not performed but that the inquirer rested content with a conjecture based on analogy.[1] But that which the individual does not or cannot achieve in a jiffy, he may achieve in the course of his life. Whole generations labor on the verification of geometry. And the conviction of its certitude is unquestionably strengthened by their collective exertions. I once knew an otherwise excellent teacher who compelled his students to perform all their demonstrations with *incorrect* figures, on the theory that it was the *logical* connection of the concepts, not the figure, that was essential. But the experiences imbedded in the concepts cleave to our sensuous images. Only the actually visualised or imaged figure can tell us what particular concepts are to be employed in a given case. The method of this teacher is admirably adapted for rendering palpable the degree to which logical operations share in reaching truth. But to employ it habitually is to miss utterly the truth that concepts draw their ultimate power from sensuous sources.

E. MACH.

VIENNA, October, 1901.

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[1] Hoelder, *Anschauung und Denken in der Geometrie*, p. 12.

RELATIONS BETWEEN EXPERIMENTAL PHYSICS AND MATHEMATICAL PHYSICS.[1]

RÔLE OF EXPERIMENT AND OF GENERALISATION.

EXPERIMENT is the sole source of truth: this alone can teach us something new; this alone can give us certainty. These two points no one may question.

But if experiment is all, what place is there for mathematical physics? What has experimental physics to do with such an auxiliary which seems useless and even perhaps dangerous? Nevertheless mathematical physics exists, and has been of undeniable service; this fact needs explanation.

Observation is not sufficient; use must be made of our observations, and for that generalisation is necessary. This has always been done; but man profiting from past errors, has observed more and more and generalised less and less. Each century has scoffed at the preceding, accusing it of generalising too boldly and too naïvely. Descartes commiserated the Ionians; Descartes in his turn makes us smile; without doubt our sons will some day laugh at us. Is there no way to get at the gist of the matter at once and escape the raillery that we foresee? May we not be content with experiment alone?

No, that is impossible and would be misunderstanding completely the true character of science. The savant must work with

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[1] Written in 1900 and delivered before the International Congress of Physics, in Paris. Translated by George K. Burgess, Docteur de l'Université de Paris, Instructor in Physics, University of California.

method; science is made of facts as a house of stones; but an accumulation of facts is no more a science than a pile of stones a house. Above all the scientist must foresee. Carlyle says: "The fact alone matters; John Lackland passed by here, that is what is admirable, here is a reality for the which I would give all the theories in the world." Carlyle was a compatriot of Bacon; like him he desired to proclaim the cult *for the God of Things as they are*, but Bacon would not have said that. It is the language of the historian. Most likely the physicist would have said: "John Lackland passed by here; never mind, for he will not pass this way again."

We all know that there are good experiments and poor ones. The latter accumulate in vain; whether there are a hundred or a thousand, a single piece of work by a real master, a Pasteur for instance, suffices to make them fall into obscurity. This, Bacon would have well understood; is it not he who invented the expression *experimentum crucis?* But Carlyle would not have understood it. A fact is a fact; a student has read a number on his thermometer, taking no precautions; no matter, he has read it, and if it is the fact only that counts, this is a reality of the same degree as the wanderings of John Lackland. What then is a good experiment? It is one which teaches us something more than an isolated fact; it aids us to predict, and enables us to generalise.

Without generalisation, prediction is impossible. The circumstances under which one has operated will never be simultaneously reproduced. The observed fact can never be realised again; the only thing that can be affirmed, is that under analogous circumstances, an analogous fact will be produced. In order to predict it is necessary to invoke analogy, that is, to generalise.

However timid one may be, it is necessary to interpolate; experiment gives us only a certain number of isolated points, which must be united by a continuous line; this is a true generalisation. But one does more, the curve so traced will pass between and near these points; but not through them. So that one is not limited to the generalisation of the experiment, he corrects it; and the physicist who would abstain from these corrections and content himself

solely with experiment would be forced to announce the most extraordinary laws. The detached facts are not enough; that is why we must have Science ordered, or better, organised.

It is often said that we must experiment with no preconceived idea. That is not possible; not only would this render sterile every experiment, but even if we wanted to do so, it could not be done. Every one has within him his idea of the world, which cannot be so easily put aside. For example, we have to make use of language, which is made up necessarily of preconceived ideas. Such ideas unconsciously held are the most dangerous of all.

Shall we say that if we cause to intervene others of which we have full consciousness, we shall but aggravate the evil? I do not think so; I believe rather that they will act as mutual counterweights, I was going to say antidotes, that in general will accord poorly and even conflict with each other forcing us to look at things from different aspects. This is enough to free us: he who can choose his master is no longer a slave.

Thus, thanks to generalisation, each observed fact enables us to predict a great number of others; but we must not forget that the first alone is certain and the others merely probable. However well founded a prediction may seem, we are never *absolutely* sure that experiment will not prove it false, if we undertake to verify it. But the probability of truth is often so great that practically we may be content with it. Better is it to predict without certainty than never to have predicted at all.

We should never disdain to make a verification when the occasion presents itself. But every experiment is long and difficult, the workers are few, and the quantity of facts that we need to predict is immense; beside this mass, the number of direct verifications that we can make will ever be a negligible quantity. Of this little that we may directly reach, we must select the better part; it is necessary that each experiment should allow the greatest possible number of predictions having the highest degree of probability. The problem is, so to speak, to increase the efficiency of the scientific machine.

Allow me to compare science to a library which must increase

indefinitely; the librarian has at his disposal for purchases but limited funds, which must not be wasted. It is experimental physics that is charged with the buying; she alone can enrich the library. As for mathematical physics, her mission is to make the catalogue; if this is well made, the library will not be richer; but it may aid the reader to make use of these riches. Also by showing the librarian the gaps in his collections, it will aid him to make judicious use of his funds; which is the more important as the funds are quite inadequate.

Such is the rôle of mathematical physics; she should direct generalisation so as to augment what I have just called the efficiency of Science. By what means she accomplishes this, and how she may do so without danger, that is what we shall examine.

THE UNITY OF NATURE.

We observe in the first place that every generalisation supposes in a certain measure the belief in the unity and in the simplicity of nature. In the case of unity there can be no difficulty. If the different parts of the universe were not as the organs of the same body, they would not react on each other, they would ignore each other mutually; and we in particular could know but one part. Consequently we have not to ask ourselves if nature is one, but how she is one.

As to the second point, all is not so clear. It is not certain that nature is simple. Can we without danger act as if she were so?

There was a time when the simplicity of Mariotte's law was an argument presented in favor of its exactness, when Fresnel himself, after having said, in conversation with Laplace, that nature did not occupy herself with analytical difficulties, was obliged to explain his words, so as not to offend the current public opinion. To-day ideas have changed much; nevertheless those who do not believe that natural laws must be simple, are still often obliged to act as if they so believed. They cannot separate themselves entirely from this appearance without rendering impossible all generalisation and consequently all science.

It is clear that any fact soever may be generalised in an infinite number of ways, and one must choose among them. The choice will be determined by considerations of simplicity. Take the case of interpolation. We draw a line as regularly as possible among the points given by observation. Why do we avoid the discordant points, the too sharp inflections? Why do we not describe a curve having the most capricious zigzags? It is because we know beforehand, or we think we know, that the law to be expressed cannot be as complicated as that. Jupiter's mass may be deduced either from the movements of his satellites, from the perturbations of the greater planets, or from those of the lesser planets. If the averages of the determinations obtained by these methods are taken, we find three numbers nearly but not quite identical. This result might be interpreted by supposing that the gravitation constant is not the same in the three cases; the observations would be certainly much better represented. Why do we reject this interpretation? Not because it is absurd but that it is uselessly complicated. It will not be accepted until it is forced upon us, and that day is not yet.

To resume, every law is reputed simple until proved otherwise.

This custom is forced upon physicists by the reasons that I have indicated; but how justify it in the presence of discoveries that daily show us new details richer and more complex? How reconcile it even with the unity of nature? For if all things are interdependent, the relations in which so many different objects intermingle cannot be simple.

If we study the history of science, we see produced two phenomena that are, so to speak, the inverse of each other: on the one hand there is a simplicity hidden under complex appearances, on the other hand an apparent simplicity conceals extremely complex realities.

What is more complicated than the troubled movements of the planets, what more simple than Newton's law? There, nature playing, as Fresnel said, with the analytical difficulties, employs but simple means and engenders by their combination I know not

what tangled snarl. Here is a case of hidden simplicity,—one which must be unravelled.

Examples of the other kind abound. In the kinetic theory of gases, we consider the molecules animated with great velocities, whose paths, deformed by incessant impacts, have the most capricious shapes, and cross space in all directions. The observable result is the simple law of Mariotte; each individual fact was complicated; the law of great numbers has re-established simplicity in the mean. Here the simplicity is only apparent, and the coarseness of our senses alone prevents us from perceiving the complexity.

Many phenomena obey a law of proportionality; but why? Because in these phenomena there is something which is very small. The simple law observed is then but a translation of this general analytical rule, according to which the infinitely small increment of a function is proportional to the increment of the variable. Since in reality the increments are not infinitely small, but very small, the proportionality law is but approximate and the simplicity is but apparent. What I have said applies to the law of the superposition of small movements, whose use is so fruitful and which is the basis of optics.

And Newton's law itself? Its simplicity, so long hidden, is perhaps only apparent. Who knows if it is not due to some complicated mechanism, to the impact of some subtle matter animated with irregular movements, and if it has not become simple merely by the play of averages and of large numbers? In any case it is difficult not to suppose that the true law contains supplementary terms, which may become sensible at small distances. If in astronomy they are negligible in comparison with Newton's expression, and if the law becomes thus simplified, this is merely on account of the enormity of the celestial distances.

Without doubt, if our means of investigation became more and more penetrating, we should discover the simple within the complex, then the complex from the simple, then again the simple within the complex, and so on, without being able to predict which would be the last term. It is necessary to stop somewhere, and

for science to be possible, we must stop where we have found simplicity. That is the only foundation upon which we can construct the edifice of our generalisations. But, the simplicity being only apparent, will this foundation be solid enough? That is what is to be studied.

For this, let us see what rôle our generalisations play in the belief in simplicity. We have verified a simple law in a considerable number of particular cases; we refuse to admit that this occurrence, so often repeated, is a result of mere chance, and we conclude that the law must be true in the general case.

Kepler finds that the positions of a planet observed by Tycho are all on the same ellipse. He has not for a single instant the thought that, by a singular chance, Tycho never regarded the heavens but at the moment when the true trajectory of the planet happened to cut this ellipse.

What does it matter then if the simplicity is real, or if it conceals a complex truth? Whether it be due to the influence of large numbers which level individual differences, or to the greatness or smallness of certain quantities which allow of neglecting certain terms, in no case is it due to chance. This simplicity, real or apparent, has always a cause. We may then reason in the same way at all times, and if a simple law has been observed in several particular cases, we may legitimately suppose that it will still be true in analogous cases. To refuse to so consider the matter would be to attribute an inadmissible rôle to chance.

Nevertheless there is a difference. If the simplicity was real and profound, it would bear the test of the increasing precision of our methods of measurement; if then we believe nature to be profoundly simple, we must conclude that it is an approximate and not a rigorous simplicity. This was formerly done; but this is what we no longer have the right to do.

The simplicity of Kepler's laws, for example, is only apparent. This does not prevent their being applied, almost exactly, to all systems analogous to the solar system, but it prevents their being rigorously exact.

THE RÔLE OF HYPOTHESIS.

Every generalisation is a hypothesis; the hypothesis has then a necessary rôle that no one has ever contested. But it should always, as soon and as often as possible, be submitted to verification. It is evident, that if it does not stand this test, it must be thrown aside without regret. This is what is usually done, but sometimes with impatience.

This impatience, however, is not justifiable; the physicist who has just renounced one of his hypotheses should be glad, on the contrary, for he has just found an unhoped-for occasion of discovery. His hypothesis, I imagine, had not been lightly adopted; it took account of all the known factors which seemed to be able to intervene in the phenomenon. If the verification is not made, it is because there is something unexpected, something extraordinary; we are on the point of finding something unknown.

Has the hypothesis so rejected been sterile? Far from it. One may even say that it has rendered more service than a true hypothesis; not only has it been the occasion of a decisive experiment, but if the experiment had been made by chance, without the existence of the hypothesis, nothing would have been inferred; nothing extraordinary would have been seen; merely one fact more would have been catalogued without deducing the least consequence.

Now under what conditions is the use of hypothesis without danger?

The firm purpose to submit all to experiment does not suffice; there are still hypotheses that are dangerous; they are in the first place and above all those that are tacit and unconscious. Since we make them without knowing it, we are powerless to abandon them. Here again is a service that mathematical physics may render. By the precision proper to it, we are obliged to formulate all the hypotheses that we should make without this aid, but without being aware of their existence.

Note, besides, that it is important not to multiply our hypotheses too fast, but to make them only one after another. If we con-

struct a theory founded on multiple hypotheses, and if experiment condemns it, which among our premises must we change? It is impossible to know. And conversely, if the experiment succeeds, are we to think all the hypotheses verified at once? Have several unknowns been determined with a single equation?

Care must also be taken to distinguish between the several kinds of hypotheses. First there are those that are quite natural and without which we could hardly do. It is difficult not to suppose that the influence of very distant bodies is quite negligible, that small movements obey a linear law, that the effect is a continuous function of the cause. I will say as much for the conditions imposed by symmetry. All these hypotheses form, so to speak, the common foundation of all theories in mathematical physics. They are the last that should be abandoned.

There is a second category of hypotheses that I will qualify as indifferent. In the greater number of questions, the analyst supposes at the outset of his calculations, either that matter is continuous, or inversely that it is made up of atoms. By either method his results will be the same. If he chooses the latter, and experiment confirms his results, will he think he has demonstrated, for example, the real existence of atoms?

Into optical theories two vectors are introduced, which are regarded, the one as a velocity, the other as a vortex. This is again an indifferent hypothesis, since the same conclusions would have been reached with contrary suppositions; the success of the experiment cannot prove that the first vector is a velocity; it proves but one thing, namely that it is a vector; this is really the only hypothesis that was introduced in the premises. To give it that concrete appearance that the weakness of our intellects requires, it was necessary to consider it either as a velocity or as a vortex; likewise it was necessary to represent it by a letter, as x or y; but the result, whatever it be, will not prove that we were right or wrong to regard it as a velocity; no more can it be proved correct or not to call it x and not y.

These indifferent hypotheses are never dangerous, provided their character is not misunderstood. They may be useful, either

as artifices for calculation, or to sustain our comprehension by concrete images, to fix our ideas, as we say. There is then no reason to proscribe them.

The hypotheses of the third category are veritable generalisations. They are the ones that experiment will confirm or prove false. Verified or condemned, they will always be fruitful. But, for the reasons that I have given, this holds only if they are not too numerous.

ORIGIN OF MATHEMATICAL PHYSICS.

Let us go farther and study at close range the conditions which have brought about the development of mathematical physics. We recognise at once that savants have always tried to resolve the complex phenomenon given directly by experiment into a very great number of elementary phenomena. And this in three different ways:

First, with respect to time, instead of embracing in its entirety the progressive development of a phenomenon, we seek simply to join each instant to the one immediately preceding; it is admitted that the actual state of the world depends only on the immediate past, without being influenced by the memory of a more remote past. Thanks to this postulate, instead of studying directly the whole succession of phenomena, it is possible to write its *differential equation* representing a single epoch; for Newton's laws Kepler's are substituted.

Next, we seek to decompose the phenomenon in space. What experiment gives us, is a confused collection of facts spread over a field of considerable extent; the task is to discern the elementary phenomenon, which is localised in a very small region of space.

A few examples will perhaps make my meaning clearer. If one wished to study in all its complexity the distribution of temperature in a solid which is cooling, it would be impossible to do so. All becomes simple if we reflect that a point in the solid cannot impart heat to a distant point, but only to the nearest, and it is only gradually that the flow of heat will be able to reach other portions of the solid. The elementary phenomenon is the exchange of

heat between two contiguous points; it is strictly localised, and it is relatively simple, if it be admitted, as is natural, that it is not influenced by the temperature of molecules whose distance is sensible.

I bend a rod; it will assume a very complicated form whose direct study would be impossible; but I shall be able to attack the problem, if I observe that the flexure is only the resultant of the deformations of the very small elements of the rod, and that the deformation of each of these elements depends only on the forces which are directly applied to it and in nowise on those which may act upon the other elements.

In all these examples, which may be increased indefinitely, it is admitted that there is no action at a distance or at great distances. This is a hypothesis; it is not always true, as the law of gravitation proves; it must then be submitted to verification. If it is confirmed, even approximately, it is precious, for it is going to permit the use of mathematical physics by successive approximations at least. If it does not stand the test, something analogous must be sought, for there are still other ways to reach the elementary phenomenon. If several bodies act simultaneously, it may happen that their actions are independent and may be added together, either as vectors or as scalar quantities. The elementary phenomenon is then the action of an isolated body. Or perhaps one has to do with small movements, or more generally with small variations, which obey the well-known law of superposition. The observed movement will then be decomposed into simple movements; for example, a sound into its harmonics, white light into its monochromatic components.

When we have discerned in what direction to seek the elementary phenomenon, by what means may we reach it?

It will often happen that to predict it, or rather to predict what is useful for us, it will not be necessary to know the mechanism; the law of great numbers will suffice. Consider the example of the propagation of heat; each molecule radiates towards its neighbors, according to a law which we have no need of knowing; if we make any supposition in this regard it will be an indifferent

hypothesis and consequently useless and unverifiable. And, indeed, by the action of averages and thanks to the symmetry of the medium, all differences are razed, and whatever the hypothesis, the result is always the same.

The same circumstances are present in the theories of elasticity and capillarity; the neighboring molecules attract and repel each other, we have no need to know according to what law; it suffices that this attraction is sensible at small distances only, that the molecules are very numerous, that the medium is symmetrical, and we have but to let the law of great numbers act.

Here again the simplicity of the elementary phenomenon was hidden beneath the complexity of the observable resultant phenomenon; but in its turn, this simplicity was only apparent and concealed a very complex mechanism.

The best way to reach the elementary phenomenon would be evidently by experiment. It would be necessary by experimental artifices, to dissociate the complex beam that nature offers to our researches and study with care its elements as purified as possible; for example, natural white light can be decomposed into monochromatic lights by means of a prism and into polarised lights by means of a polariser.

Unfortunately this is neither always possible nor sufficient, and it is sometimes necessary for the mind to anticipate the experiment. I will cite but a single example which has always appealed to me.

If I decompose white light, I can isolate a small portion of the spectrum, but however small it may be, it always conserves a certain width. Similarly, the natural lights called *monochromatic* give us a very fine line, although not infinitely fine. One might suppose that in studying experimentally the properties of these natural lights, operating with finer and finer spectral beams, and passing at last to the limit, one would come to know the properties of a light rigorously monochromatic. This would not be so. Imagine that two beams start from the same source, that they are polarised in two planes at right angles, afterwards brought into the same plane of polarisation, and that one tries to make them inter-

fere. If the light were *rigorously* monochromatic they would interfere, but with our nearly monochromatic lights there would be no interference, and this however narrow the beam; it would be necessary in order to have it otherwise that the beam be several million times narrower than the finest known. Here then the passage to the limit would have deceived us; the intellect has outstripped experiment, and if this has been successfully done, it is because the former was guided by the instinct of simplicity.

A knowledge of the elementary fact permits us to put the problem into the form of an equation; it only remains to deduce from this by combination the complex observable and verifiable fact. This is what is called *integration*; it is the mathematician's affair.

It may be asked why, in the physical sciences, a generalisation readily takes the mathematical form. The reason is now easy to see; it is not merely that one has to express numerical laws; it is because the observable phenomenon is due to the superposition of a great number of elementary phenomena *all similar to each other*; in this way the differential equations are quite readily introduced.

It is not sufficient that each elementary phenomenon obeys simple laws, it is necessary that all to be combined obey the same law. It is only then that the intervention of mathematics may be useful; mathematics teaches us, in fact, to combine like with like. Its goal is to divine the result of a combination, without passing through all the intermediate steps each time. If we have to repeat several times the same operation, it enables us to avoid this repetition by informing us beforehand of the result by a sort of induction. In such cases all these operations must be similar to each other, otherwise we should have to go step by step, and mathematics would become useless.

It is thus of the approximate homogeneity of matter studied by the physicist that mathematical physics could be born. In the natural sciences, we do not find these conditions: homogeneity, relative independence of distant parts, simplicity of the elementary part; and that is why naturalists are obliged to make use of other modes of generalisation.

SIGNIFICATION OF PHYSICAL THEORIES.

Men of the world are struck to see how transient are scientific theories. After several years of prosperity, they see them successively abandoned; they see ruins pile on ruins; they predict that the theories current to-day will, after a brief delay, in their turn succumb, and they conclude that such theories are absolutely in vain. It is what they call the *bankruptcy of science.*

Their scepticism is superficial; they take no account whatever of the object and rôle of scientific theories, otherwise they would understand that the ruins are still good for something. No theory seemed so well established as Fresnel's which attributed light to movements of the ether. However, that of Maxwell is to-day preferred. Does this mean that the work of Fresnel has been in vain? No, for Fresnel's goal was not to know whether there really is an ether, whether or not it is formed of atoms, whether these atoms move in such or such a way; it was to predict optical phenomena. As for that, Fresnel's theory enables us to do this to-day as well as it did before Maxwell. The differential equations are always true; they may always be integrated by the same methods and the results of this integration ever preserve their value.

Let no one say that we thus reduce physical theories to simple practical recipes; these equations express actual relations, and if the equations remain true, it is because these relations preserve their reality. They teach us, now as before, that there is such and such a relation between this thing and that; only, something which we called *movement* before, we now call *electric current.* But these names were only images substituted for the real objects that nature will forever hide from us. The true relations between these real objects are the only reality that we can reach, and the sole condition is that the same relations shall exist between these objects as between the images we are forced to put in their place. If these relations are known to us, what matters it if we judge it convenient to replace one image by another?

That a given periodic phenomenon (an electrical oscillation for instance) is really due to the vibration of a given atom which,

behaving like a pendulum, is displaced in such or such a way, all this is neither certain nor interesting. But that there is between the electrical oscillation, the movement of the pendulum, and all periodic movements an intimate relationship which corresponds to a profound reality; that this relationship, this similitude, or better this parallelism is continued in the details; that it is a consequence of more general principles, as the conservation of energy and least action,—this we may affirm; this is the truth that will remain forever the same in all the guises in which we may see fit to dress it.

Numerous theories of dispersion have been proposed. The first were imperfect and contained but little truth. Then came Helmholtz's, which was modified in various ways; and its author himself has imagined another based on Maxwell's principles. But the remarkable thing is, that all the scientists who have followed Helmholtz reach the same equations, from seemingly widely separated starting-points. I venture to say that these theories are all true at once, not merely because they allow us to predict the same phenomena, but because they express a true relation, that between absorption and anomalous dispersion. In the premises of these theories, that which is true is common to all; it is the affirmation of such or such a relation between certain things that some call by one name some by another.

The kinetic theory of gases has given rise to many objections, to which reply would be difficult, if there had been any claim that it contained absolute truth. But all these objections cannot refute its past usefulness, particularly in revealing to us the one true relation, otherwise profoundly hidden, between gaseous and osmotic pressures. In this sense it may be said to be true.

When a physicist finds a contradiction between two theories which are equally dear to him, he sometimes says: Let us not be troubled but let us hold fast to the two ends of the chain that the intermediate links be not lost to us. This argument of the embarrassed theologian would be ridiculous if we are to attribute to physical theories the sense given them by men of the world. In case of contradiction, one of them at least should then be considered false. It is no longer so if we will seek in them what is

to be sought. It may be they both express true relations and that there is contradiction only in the images with which we have dressed reality.

To those who find that we restrict too much the domain accessible to the scientist, I reply: These questions which we prohibit you from studying and which you so regret, are not only insoluble, they are also illusory and void of sense.

Your philosopher claims that all physics can be explained by the mutual impact of atoms. If he means that the same relations obtain among physical phenomena as among the mutual impacts of a great number of billiard-balls, nothing better, this is verifiable, it is perhaps true. But he means to say something more; and we think we understand him because we think we know what an impact is in itself. Why? simply because we have often seen a game of billiards. Are we to understand that God, in contemplating his work, feels the same sensations as we in the presence of a billiard match? If we do not wish to give to his assertion this fantastic meaning, if also we do not wish to give it the one I previously mentioned, then it has no meaning whatever.

Hypotheses of this nature have only a symbolic sense. The scientist should not banish them any more than a poet banishes metaphor; but he should know what they are worth. They may be useful to give satisfaction to the mind, and they will not be harmful provided they are but indifferent hypotheses.

These considerations show us why certain theories that were thought to be abandoned and definitely condemned by experiment, are suddenly revived from their ashes and recommence a new life. It is because they express true relations, and had not ceased to do so, when for some reason or other we thought it necessary to enunciate the same relations in another language. They had thus kept a sort of latent life.

Hardly fifteen years ago, was there anything more ridiculous, more quaintly old-fashioned, than the fluids of Coulomb? But nevertheless here they reappear under the name *electrons*. In what do these molecules electrified in a permanent way differ from the electric molecules of Coulomb? True, in the electrons the elec-

tricity is supported by a little, though very little, matter; in other words, they have mass. But Coulomb did not gainsay mass to his fluids; or if he did, it was reluctantly. It would be rash to affirm that the belief in electrons will not also undergo its eclipse; but it was not less curious to remark this unexpected renaissance.

But the most striking example is Carnot's principle. Carnot established it, starting from false hypotheses. When it was perceived that heat is not indestructible but may be converted into work, his ideas were completely abandoned; later Clausius returned to them and caused them to triumph definitively. Carnot's theory, in its primitive form, expressed, besides true relations, other inexact relations, *débris* of old ideas; but the presence of the latter did not alter the reality of the others. Clausius had but to separate them as one cuts away dead branches.

The result was the second law of thermodynamics. The relations were always the same, although these relations did not hold, in appearance at least, between the same objects. This sufficed to preserve for the principle its value. Nor have the reasonings of Carnot perished by reason of this; they were applied to matter infected with error; but their form (that is to say, their essential part) remained correct.

What I have said throws light at the same time on the rôle of general principles like the principles of least action and the conservation of energy. These principles have a very great value; they were obtained in seeking what was common in the statements of numerous physical laws; they thus represent the quintessence of innumerable observations. However, from their very generality results a consequence to which I have called attention in the preface to my *Course on Thermodynamics;* it is that they are of necessity verified. Since we cannot give energy a general definition, the principle of the conservation of energy signifies simply that there is a *something* that remains constant. Whatever new notions of the world future experiments may give us, we are certain beforehand that there is something which will remain constant, and which we may call *energy*.

Does this mean that the principle has no sense and vanishes

into a tautology? Not at all; it means that the different things we call *energy* are joined by a true relationship. But even if this principle has a meaning, it may be false; perhaps we have no right to deduce applications from it indefinitely, and yet it is sure beforehand to be verified in the strict sense of the word. How then shall we be warned when it has reached the full development that we may legitimately give it? Simply when it ceases to be useful, or when we may no longer use it to correctly predict new phenomena. We shall be sure in such cases that the relation affirmed is no longer true; for otherwise it would be fruitful; experiment, without directly contradicting a new extension of the principle, will nevertheless have condemned it.

PHYSICS AND MECHANISM.

Most theorists have a constant predilection for explanations borrowed from mechanics or dynamics. Some would be satisfied if they could account for all phenomena by the movement of molecules attracting one another according to certain laws. Others are more exacting, they would suppress attractions at a distance; their molecules would follow rectilinear paths from which they could only be deviated by impacts. Still others, as Hertz, suppress also the forces, but suppose their molecules submitted to geometrical connections analogous, for example, to those of articulated systems; they thus wish to reduce dynamics to a sort of kinematics. All, in a word, wish to bend nature into a certain form, lacking which their minds cannot be satisfied. Is nature flexible enough for this?

I have already put the question in the preface to my work: *Electricity and Optics*. I have shown that every time the principles of energy and of least action are satisfied, not only is there always a mechanical explanation possible, but there is always an infinity of them. Thanks to a well-known theorem on articulated systems due to Koenigs, it may be shown that everything may be explained in an infinite number of ways by connections after the manner of Hertz, or else by central forces. Without doubt, it might be just

as easily demonstrated that everything may be explained by simple impacts.

For this, bear in mind, it is not sufficient to be content with ordinary matter, which comes in contact with our senses and whose movements we observe directly. Ordinary matter may be conceived either as formed of atoms whose inner movements escape us, the displacement of the whole being alone accessible to our senses, or one of those subtle fluids may be imagined which, under the name *ether* or other names, have always played such an important rôle in physical theories.

Often one goes farther and regards the ether as the only primitive matter, or as the only true matter. The more moderate consider ordinary matter as condensed ether, which is in no way startling; but others reduce still further its importance and see in matter only the geometrical locus of the singularities in the ether. Thus, for Kelvin, what we call *matter* is but the locus of the points at which the ether is animated by vortex motions; for Riemann, it was the locus of the points at which ether is constantly destroyed; for more recent writers, Wiechert or Larmor, it is the locus of the points at which the ether has undergone a sort of torsion of a very particular kind. Taking any one of these points of view, the question arises in my mind, by what right do we apply to the ether, under pretext that it is true matter, the mechanical properties observed in ordinary matter, which is but false matter?

The ancient fluids, caloric, electricity, etc., were abandoned when it was seen that heat is not indestructible. But they were abandoned also for another reason. In materialising them, their individuality, so to speak, was emphasised, gaps were opened between them. It was necessary to fill in these gaps when the sentiment of the unity of nature became stronger, and when the intimate relations binding all parts were perceived. In multiplying the fluids, not only did the ancient physicists create unnecessary entities, but they broke down real ties. It is not sufficient that a theory does not affirm false relations, neither must it hide true relations.

Does our ether actually exist?

We know whence comes our belief in the ether. If light takes several years to reach us from a star, it is no longer upon the star nor yet upon the earth; but it must be somewhere, and supported by some material agency.

The same idea can be expressed in a more mathematical and abstract form. What we note are changes undergone by material molecules; we see, for example, that our photographic plate experiences the consequences of phenomena of which the incandescent mass of a star was the theatre several years ago. Now, in ordinary mechanics, the state of the system studied depends only on its state at the moment immediately preceding; the system satisfies certain differential equations. On the other hand, if we did not believe in the ether, the state of the material universe would depend not only upon the state immediately preceding, but also upon much more ancient states; the system would satisfy equations of finite differences. It is to obviate this transgression of the general mechanical laws that we have invented the ether.

This would oblige us to fill the interplanetary space with ether, but not to make it penetrate into the midst of material media. Fizeau's experiment goes farther. By the interference of rays that have passed through water or air in motion, it seems to show us two different media penetrating each other and yet moving with respect to each other. We all but touch the ether.

Situations may be conceived in which we can touch it closer still. Suppose Newton's principle of the equality of action and reaction is not true if applied to matter *only* and that this is demonstrated. The geometrical sum of all the forces applied to all the material molecules would no longer be zero. It would be necessary, if we did not wish to change the whole science of mechanics, to introduce the ether, in order that the action that matter here apparently undergoes should be counterbalanced by the reaction of matter on something.

Or again, suppose we discover that optical and electrical phenomena are influenced by the movement of the earth. It would follow that these phenomena could reveal to us not only the relative movements of material bodies, but also what would seem to be

their absolute movements. It would again be necessary to have an ether, in order that these so-called absolute movements should no take place with respect to empty space, but with respect to somet thing concrete.

Will this ever be accomplished? I do not cherish the hope, and I will say shortly why. And yet, it is not so absurd since others have entertained it. For example, if the theory of Lorentz were true, Newton's principle would not apply to matter *alone*, and the difference would not be very far from being accessible to experiment. On the other hand, many experiments have been made on the influence of the earth's movement. The results have always been negative. But if these experiments have been undertaken, it is because we were not sure beforehand, and indeed according to the reigning theories, the compensation should be only approximate, and we should expect to see improved methods give positive results.

I think that such an experiment is illusory; it was none the less interesting to show that a success of this kind would open in a certain sense a new world.

And now allow me to digress slightly; I must explain why I do not believe, in spite of Lorentz, that more exact observations will ever make evident anything else than relative displacements of material bodies. Experiments have been made that should have disclosed the terms of the first order; the results were negative; can that have been by chance? No one has admitted it; a general explanation was sought, and Lorentz found it; he showed that the first order terms should cancel each other, but not the second order terms. Then more precise experiments were made, which were also negative; neither could this be a result of chance; an explanation was necessary and was found; they are always found; hypotheses are what we lack the least.

But this is not enough; who does not think this leaves too important a rôle to chance? Would it not be also a chance that this singular concurrence would cause a certain circumstance to destroy the terms of the first order, and that a totally different circumstance should cause those of the second order to vanish? No, it is

necessary to find the same explanation for the two cases, and everything tends to show that this explanation would serve just as well for the higher order terms, and that the mutual destruction of these terms will be rigorous and absolute.

ACTUAL STATE OF THE SCIENCE.

In the history of the development of physics two opposite tendencies are to be distinguished. On the one hand, at each instant new relations are discovered between objects which seemed destined to remain forever separated; scattered facts cease to be strangers to each other; they tend to arrange themselves into an imposing synthesis. Science marches towards unity and simplicity.

On the other hand, observation reveals every day new phenomena; they must wait for their place a long time; and sometimes to make one, a corner of the edifice must be demolished. In the known phenomena themselves, where our crude senses indicate unity, we perceive details more varied from day to day; what we thought to be simple becomes complex and science seems to march towards diversity and complication.

Of these two opposite tendencies each of which seems to triumph in turn, which will win? If the first, science is possible; but nothing proves this *a priori*, and possibly after vain efforts to bend nature in spite of herself to our ideal of unity, submerged by the ever-mounting flood of our new riches, we shall be compelled to renounce classifying them, abandon our ideal, and reduce science to the recording of innumerable recipes.

We cannot reply to this question. All that we can do is to observe the science of to-day and to compare it with that of yesterday. From this examination we may doubtless draw some conjectures.

A half century ago, hopes were high. The discovery of the conservation of energy and of its transformations had just revealed the unity of force. It showed also that the phenomena of heat could be explained by molecular movements. The nature of these movements was not exactly known, yet no one doubted but that it soon would be. For light, the work seemed completely done. As

concerns electricity, the advancement was less great. Electricity had just annexed magnetism. This was a considerable step towards unity, and a definite one. But in what way was electricity to enter in its turn into the general unity, how was it to be included in the universal mechanism? No one had any idea. The possibility of this reduction was not doubted by any one; they had faith. Finally, as to what concerns the molecular properties of material bodies, the reduction seemed still easier; but all the details were hazy. In a word, the hopes were vast, they were strong, but they were vague.

To-day what do we see? In the first place, a step in advance, an immense progress. The relations between electricity and light are now known; the three domains of light, electricity, and magnetism, formerly separated, are but one now; and this combination seems definite. This conquest, nevertheless, has cost us some sacrifices. Optical phenomena enter as particular cases in electrical phenomena; as long as the former remained isolated, it was easy to explain them by movements thought to be known in all their details; that was easy. But now an explanation, to be acceptable, must be readily applicable to the whole electrical domain. This often causes difficulty.

The most satisfactory theory we have, is that of Lorentz; it is unquestionably the one that best explains the known facts, the one that sheds light on the greatest number of true relations, the one in which are to be found the most traces of definite construction. Nevertheless, it still possesses a serious fault, as I have above shown; it is in contradiction with Newton's principle of the equality of action and reaction; or rather, in the eyes of Lorentz, this principle is not applicable to matter alone; in order to be true, it must take account of the actions exerted by the ether on matter, and of the reaction of matter upon the ether. At present it seems most probable that things do not happen in this way.

However this may be, thanks to Lorentz, the results of Fizeau on the optics of moving bodies, the laws of normal and anomalous dispersion and of absorption have been connected together and with the other properties of the ether by bonds that doubtless will

not break. Look at the ease with which the Zeeman effect found its place, and even helped to classify the magnetic rotation of Faraday which had remained rebellious to Maxwell's efforts. This facility proves that Lorentz's theory is not an artificial assemblage destined to give way. Probably it should be modified, but not destroyed.

Lorentz had no other ambition than to include in a single whole all the optics and electrodynamics of moving bodies; he made no pretense to give a mechanical explanation. Larmor goes farther; keeping of Lorentz's theory what is essential, he grafts on it MacCullagh's ideas on the direction of the movement of the ether. However ingenious this effort may be, the fault in Lorentz's theory remains, and is even aggravated. According to Lorentz, we do not know what the movements of the ether are; thanks to this ignorance, we might suppose them such as compensated those of matter and re-established the equality of action and reaction. With Larmor, we know the movements of the ether, and we can demonstrate that the compensation does not take place.

If Larmor has to my mind failed, does that mean that a mechanical explanation is impossible? Far from it: I said above that as long as a phenomenon obeys the two principles of energy and least action, it permits of an infinite number of mechanical explanations. It is the same for optical and electrical phenomena.

But that does not suffice: for a mechanical explanation to be good, it must be simple; in order to choose it from among all those that are possible, there must be other reasons than the necessity to make a choice. Well, a theory which satisfies this condition and which consequently might be useful, we do not posses as yet. Are we to complain? That would be to forget the end sought, which is not the mechanism, but the true and sole aim of unity.

We should then bridle our ambition; let us not seek to formulate a mechanical explanation; let us be content to show that we may always find one if we so wish. In this we have succeeded; the principle of the conservation of energy has always been confirmed; a second principle has been joined to this, that of least action, put in the form appropriate to physics. This also has always been

verified, at least as far as concerns reversible phenomena, which obey Lagrange's equations, that is to say, the most general laws of physics.

The irreversible phenomena are much more rebellious. They also, however, are being arranged and tend to enter the unity: the light which illuminates them has come from Carnot's principle. For a long time thermodynamics was confined to the study of the dilatation of bodies and their change of state. Later it became bolder and enlarged its domain considerably. We owe to it the theories of the voltaic cell and thermo-electric phenomena; there is not in all physics a corner that it has not explored, and it has even attacked chemistry. Everywhere the same laws reign; everywhere under a diversity of appearances Carnot's principle reappears; everywhere also appears that eminently abstract concept of entropy, which is as universal as energy, and like it seems to conceal a reality. Radiant heat seemed to escape it; but recently that too has been brought under the same laws.

In this way new analogies are revealed, which may often be pursued in detail; electric resistance resembles the viscosity of liquids; hysteresis resembles rather the friction of solids. In all cases, friction appears to be the type imitated by the most diverse irreversible phenomena, and this relationship is real and profound.

A strictly mechanical explanation of these phenomena has also been sought. Such is hardly possible. To find it, it has been necessary to suppose that the irreversibility is but an appearance, that the elementary phenomena are reversible and obey the known laws of dynamics. But the elements are extremely numerous and blend more and more, so that to our crude eyes all appears to tend towards uniformity, that is to say, all seems to march in the same direction without hope of return. The apparent irreversibility is thus but an effect of the law of great numbers. Only a being of infinitely subtle senses, as the imaginary demon of Maxwell, could untangle this snarl and turn the world about.

This conception, which is connected with the kinetic theory of gases, has cost great effort, and has been on the whole not very fruitful; it may become so. This is not the place to examine if it

leads to contradictions, and if it conforms well to the true nature of things.

Let us notice, however, the original ideas of Gouy on the Brownian movement. According to this *savant*, this singular movement does not obey Carnot's principle. The particles that it sets moving about are smaller than the meshes of this tightly drawn net; they should then be ready to unravel them and in that way turn the world about. One may imagine he sees Maxwell's demon at work.

To resume, phenomena long known are better and better classified; but new phenomena come to claim their place; and most of them, as the Zeemann effect, find it at once.

But we have the cathode rays, the X-rays, the uranium and radium radiations. There is a whole world that none suspect. How many unexpected guests to find a place for! No one can yet predict the place that they will occupy. But I do not think they will destroy the general unity, I think rather they will complete it. On the one hand, indeed, the new radiations seem to be connected with the phenomena of luminescence; not only do they excite fluorescence, but they arise sometimes under the same conditions as it. Neither are they without relationship with the causes producing the spark discharge under the action of ultra-violet light.

Finally, and above all, it is believed that in all these phenomena there exist ions,—animated, it is true, with far greater velocities than in electrolytes.

All this is very vague, but it will become clearer.

Phosphorescence and the action of light on a spark were regions quite isolated and consequently somewhat neglected by investigators. It is to be hoped that now a new path may be made which will facilitate their communication with the rest of science.

Not only do we discover new phenomena, but in those that we think we know, unlooked-for aspects are revealed. In the free ether, the laws preserve their majestic simplicity; but matter, properly so called, seems more and more complex; all that is said of it is but approximate and at each instant our formulæ require new terms.

Nevertheless the ranks are not broken; the relations that we have recognised between objects that we believed simple, still remain between the same objects when recognised in their complexity, and that alone is important. Our equations become more and more complicated, it is true, so as to embrace more closely the complexities of nature; but nothing is changed in the relations which permit these equations to be derived from one another. In a word, the *form* of these equations persists.

Take for example the laws of reflexion; Fresnel established them by a simple and attractive theory, which experiment seemed to confirm. Subsequently, more precise researches proved that this verification was only approximate; they showed everywhere traces of elliptical polarisation. But, thanks to the aid given us by the first approximation, the cause of these anomalies was soon found in the presence of a transition layer; and Fresnel's theory has remained in all its essentials.

It would seem, nevertheless, that all these relations would never have been noted if the complexity of the objects they joined had been known beforehand. Long ago it was said: If Tycho had had instruments ten times as precise, we should never have had either Kepler, Newton, or Astronomy. It is a misfortune for a science to be born too late, when the means of observation have become too perfect. This is what is happening to-day with physical chemistry; the founders are hampered in their estimates by the third and fourth decimals; happily they are men of robust faith.

As the properties of matter are better known, we see that continuity reigns. From the work of Andrews and Van der Waals, we see how the transition from the liquid to the gaseous state is made, and that it is not brusque. Similarly there is no gap between the liquid and solid states, and we note in their work by the side of articles on the rigidity of liquids memoirs on the flow of solids.

With this tendency simplicity without doubt is lost; such and such an effect was represented by several straight lines; it is necessary now to join these lines by curves more or less complicated. In return unity is gained. These separated categories quiet the mind but do not satisfy it.

Finally the methods of physics have invaded a new domain, that of chemistry; physical chemistry is born. It is still quite young, but we see that already it has allowed us to connect such phenomena as electrolysis, osmosis, and the movements of ions.

From this rapid exposition, what do we conclude?

Taking all things into account, unity has become more nearly realised; this has not been as quickly done as was hoped fifty years ago, and the way predicted has not always been followed; but, on the whole, much ground has been gained.

H. POINCARÉ.

PARIS, 1900.

THEOLOGY AS A SCIENCE.

AN INVESTIGATION OF THE PART THAT THE WILL PLAYS IN RELIGION WITH SPECIAL REFERENCE TO THE PRESENT SITUATION CAUSED THROUGH THE INCREASING INFLUENCE OF SCIENCE UPON FAITH.

RELIGION and Science are as disparate and as diametrically opposed to one another as are sentiment and knowledge, or poetry with its indeterminable flights of fancy, and mathematical argument; and this fact seems sufficient to draw a line of demarcation between the two, which would keep our religious and scientific notions quite distinct and not permit either one to interfere with the other. Religion is of the heart; it is the warm devotion to the noblest cause imaginable; it is a zeal and enthusiasm for, and a faith in, an ideal that lies in spheres transcendent, while science is the ruthless unblinking investigation of facts, consisting of mental functions that may well be compared to the operations of a calculating machine, with which sentiment must not interfere, and of which the results are the more reliable the less the personal equation of subjective preferences enters into them.

This contrast between Religion and Science is not exaggerated, and so it seems to justify the old dualism that some statement may be true in religion or theology which is utterly untrue in science. Indeed artistic imagination has rules of its own and the causation of poetic dreams is different from the causation of scientific facts. The former in the domain of the latter would be lies; the latter in the domain of the former, prosaic and meaningless trivialities.

We recognise this contrast and believe fully in the right of both Religion and Science to exist in their own name with institutions that are relatively independent and not subject to one another, but correlated in harmonious alliance. Yet we do not believe in a duality of truth or a separation of the spheres of life as if there were two worlds, a realm of religion which lies in a Beyond and a domain of science which is the reality of matter in motion that surrounds us here. We believe that the fields of both are the same and that in spite of their disparity the two are inseparably linked together as husband and wife ought to be in well-ordained wedlock. When we encourage the science of religion (an investigation of the facts of religion), and come, on the other hand, to the conclusion that there is religion in science which may be formulated as a religion of science, we are perfectly aware of the difficulty of the undertaking. We do not slur over the contrast that actually and obviously exists, but on the contrary, we appreciate its significance and point out a *modus vivendi* as to how the contrast may be preserved without injury to either party, for a contrast is not a contradiction and involves conflicts only when it is wrongly interpreted and its nature misunderstood.

RELIGION.

Religion has been defined differently as belief in a deity, as devotion to the supernatural, as worship, or also as obedience to the behests of God, etc., but it is obvious that the definitions of the catechisms are one-sided; they suit the case for home use well enough but keep only in view one feature of religion. Religion is broader than its usual definitions: it affects the whole man, his heart, his head, his conduct, and there are religions which imply definite beliefs, especially the belief in God, while others do not. Buddhism, e. g., so far as its original tenets are concerned, can be taught and practiced without even the mention of the word God or a belief in him, and yet it is as decidedly, not a mere philosophy, but a religion, as is Christianity, or the Mosaic faith, or Islam, or Brahmanism, or Mazdaism. That which characterises religion is the predominance of sentiment. There is no religion without senti-

ment, but as there is no sentiment in itself; so religious sentiment has always a definite content and is characterised by a principle of conduct imparting a definite direction to the minds of its devotees. The former (the contents) is the notion upon which it is built up, the latter the moral ideal in which it finds expression. In other words: while sentiment is the core and center of religion, the sentiment feeds upon the materials furnished by the intellect and manifests itself in practical life as will.

Religion is everywhere the sentiment of adapting oneself to the ruling power of one's surroundings, and thus it presupposes a definite world-conception and implies that this world-conception serves as a guide in life. Hence there are three elements in religion: its root is of the head, consisting of the notions concerning the significance of life; in its essential nature it is sentiment; *Gefühl ist alles;* and in the average man, who is untrained in self-analysis, the religious sentiment is a mysterious mass of yearnings, hopes, fears, visions of bliss and ecstatic upliftings which defy the explanation of scientific enquiry; but its most significant feature is, after all, the impulse it gives to action. Religion is always practical; it has a moral application, and the immoral customs of savage or barbarous, and semi-civilised religions only prove that religion and morality are inseparable. An immoral religion leads to immoral practices, and a pure religion will unfailingly tend to elevate and purify conduct.

There are three distinct elements in religion: (1) doctrine, (2) piety, and (3) conduct. All three are indispensable, but now the one, now the other is emphasised. The doctrine may be blind faith, or a philosophically purified belief, or a clear scientific comprehension. A doctrine that on account of its nature strongly affects our sentiment and then becomes a principle of conduct is called a conviction; and all those convictions which affect our notion of the purpose of life in general constitute our religion.

An essential feature of a religious conviction is the recognition of its rule or principle or maxim as obligatory, for that which is acknowledged to be right or good or commendable, should, on penalty of punishment or of evil results, be carried into effect. In

other words, a religious conviction implies a duty to be performed, or a command to be obeyed.

The authority upon which the duty depends (i. e., that which renders it obligatory) need not be a personal being; it may simply be the universality of law which, when recognised, teaches us that all causes have their effects, and that evil deeds beget evil consequences. But whatever the nature of the authority, its conception as something superior exercises an educational influence; it holds up an ideal to be attained, and thus stimulates man to reach beyond and to grow above his present stature. Since the average man, even of to-day, is little trained in philosophical thought, it is but natural that he will personify the authority of conduct and think of the divine (the supreme norm of existence) in terms human, shaping God in man's own image. But whatever the authority of conduct may be, we call it God and would say that a belief in God (viz., the recognition of an authority of conduct) is an essential feature of religion.

Having broadened the conception of God so as to include all possible views, we may now, without fear of being misunderstood, fall back upon the definition of religion in terms of Christian theology and say: "Religion is the faith in, the love of, and the obedience to, God." But whatever point of view we may take, religion is always triple in its aspect: It is: (1) idea, (2) devotion, (3) deed. The idea is the product of our intellect, the devotion is sentiment, and the deed is the expression of our will.

MAN ALONE RELIGIOUS.

According to the antiquated notions of prescientific psychology, intellect, sentiment and will were three distinct powers or faculties of man, but modern psychology, having discarded the assumption of faculties, looks upon them as phases and features only in man's psychic dispositions.

The change may be best explained in the instance of memory.

We no longer believe in memory as an organ of the mind but regard it now as a general disposition of mental functions. Every sense-impression that is perceived is a psychic act; it is conscious

for a moment and then disappears from the field of consciousness. But it is not entirely obliterated; it only sinks below the limit of that mental state which is clearly felt. It ceases to be conscious and becomes subconscious. Being present in the mind, in an unconscious condition but as a definite trace, it can by a proper stimulus be revived; and we generalise this feature of mental proceedings as "memory." To conceive of memory, which is a general function, as if it were a definite faculty having its own center in a special bump of the brain, is an antiquated conception; and similarly all the faculties as distinct provinces of the mind have been done away with.

There is no definite place in the brain where sentiment has its seat nor another where the intellect operates, nor a third where the will reigns; but all, sentiment, intellect, and will, are three phases in one and the same process; they have their seats (if we may use the word) all over the organ of the mental functions and are abstract terms that designate the several significant features of the whole process.

There may be regions in the brain where either the sensation or the motor impulse is the significant feature of cerebral activity, as we have reason to assume of the several sensory and motor centers; but these centers are stations only on a longer road, and the nature of their activity is determined by their co-operation with other brain-structures. At any rate they are not isolated organs of sentiment, of thought, and of will, but interacting parts of one indivisible process; and in all actions of man these three aspects of his soul-life are indispensable, and every one of them plays an important part.

Religion is a product of experience, and thus it is decidedly a child of the intellect. Objects of inorganic nature, celestial bodies as well as the atoms of chemical reagents, are endowed with energy, but if we call their motions (by an indulgence in poetic language) actions of a will, it is a blind will only; they act, and their actions agree with the natural laws, yet they have no religion. Further, the brute creation is possessed of sensation, and we know that many animals are capable of most tender feelings, yet they

have no religion. Man alone possesses religion, because his intellect has attained the height of rationality. Man's conceptions beget religion, and man's religion can be modified by a modification of his conceptions.

Suppose a primitive man witnessing a thunderstorm is suddenly surprised by a tremendous flash of lightning which breaks down a tall tree in his immediate vicinity and is accompanied by the awful roar of a thunderclap. Think of the animistic notions he has concerning the powers of nature, his helplessness in facing them, his fear of being slain, his gratitude for having escaped, etc., etc.! What a storm of passionate feelings excites his soul! His notions concerning the power of the being that causes the thunderstorm is intensified, and he is willing to submit to its behests whatever the command may be. Or again, think of the same man seeing in a dream his deceased father, his slain enemy, a murdered friend, or some other dead person: he believes in the reality of the vision and wakes up with the idea that he has conversed with the ghost of the departed. How will he be stirred! And how quickly will he obey the commands of the spirits! The intensity of the sentiment gives power to the will, and the sentiment in its turn is the reaction of man's soul upon a definite kind of experience.

THE SUBJECTIVITY OF SENTIMENT.

Sentiment seems to us a purely subjective factor, and so will appears arbitrary. The whims of both are quite enigmatic and frequently defy a rational explanation by pure self-introspection, even on honest self-observation. The prominent part which they play in psychology and ethics has been recognised since time immemorial, and all moralists, all public orators, all educators, are agreed on this: that to gain success a reformer must work through the sentiment on the will. Our sentiments are, properly understood, we ourselves, and those sentiments that preside over and dominate our impulse ideas which in their totality are comprised under the name of "will," are the dynamic power of our mental life. The will is king.

We can easily understand how the will, being personified in the prescientific period of psychology, becomes "the thing-in-itself," and in Schopenhauer's system it is conceived as the mysterious metaphysical entity which comes to the rescue when science ceases and the dreams of metaphysics begin. The superiority of the will, as the motor power in man, being recognised, Nietzsche goes so far as to banish reason, and logic, and the entire intellect, including objectivity of truth, declaring the will in its full arbitrariness to be the autocrat of everything. The intellect is the handmaid of the will and ought to be nothing better; for truth is truth only (so Nietzsche says) if it pleases the will to be so. And these doctrines are echoed in America by a man of most conservative tendencies, Professor William James of Harvard, who has worked out a special theory of "the will to believe," cherishing the opinion that the will is justified in forming its belief according to its "organic needs," and not in compliance with arguments or scientific investigations.[1]

It is not our intention here to criticise either Schopenhauer, Nietzsche, or James; we adduce their views only to prove the importance and the necessity of a ventilation of the significance of the will. We take exception to their views. The will is not a metaphysical entity, it is not an isolated faculty, or a monarch in the commonwealth of the soul: the will is an abstract term denoting the condition of a conscious image, or notion, or idea, or plan, in the mind of man, pressing him to action.

Will implies three factors: (1) the idea, or plan, or conception; (2) consciousness or feeling, viz., a state of awareness which may be intense or weak, passionate and fitful or quiet and steady, joyous and jubilant, or painful; full of excitement or indifferent; and (3) the realisation, or at least inchoate realisation, in deeds.

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[1] I may be mistaken in my conception of James, for he must not always be taken literally. He is more of a prophet than a philosopher and may in his desire to emphasise a statement easily go to extremes. Though there are many statements of his which I cannot endorse, I find him always interesting and in addition personally sympathetic. He is decidedly a noteworthy personality, and I refer to him on account of the significance which I attach to him. Should I misrepresent him, he is cordially invited to correct my statements.

The latter is that which characterises the state as Will in contrast to feeling, and has led to the definition of will as "a state passing into act."

Accordingly there is no will which would be will pure and simple. Every will is possessed of a contents of some kind, and the contents of the will is an idea, which is a product of the intellect.

THE PERSONAL EQUATION.

Now, we grant that in all practical questions in life there is a subjective element that belongs and must belong to what may be called the personal equation. The facts that lie before us in a given case are not sufficient to form an opinion or to determine the course that a special person should take. The attitude of the person toward the facts is an important part of the whole combination, and this "personal equation" cannot be the same for all people. It will be and must be different with different personalities.

The truth is that no two persons facing the same situation, even when understanding the situation to be the same, will assume the same attitude. Thus, a recognition of the nature of the soul as a compound produces a different impression upon different idiosyncrasies. Buddha expresses it in his doctrine of the three characteristics of life, that all compounds are transitory, that their existence implies misery, and that there is no thing-in-itself, no stable ego-entity (*atman*); and he derives from it his moral teaching of unselfishness, or non-assertion, of a surrender of all clinging to worldly pleasures and a universal loving-kindness toward all beings. How different is the attitude of Omar Khayyam! Life is fleeting, there is no permanency, and our personality too is a cluster of effects without any stable entity behind it. But his conclusion is not that therefore man must renounce the impermanent and seek that which is permanent, by surrendering his egotism which is based upon the illusion of self, but on the contrary, he advises clinging to the fleeting moment, sipping the cup of joy to the dregs, and leaving all other thoughts to dreamers. To him, life has no sense except enjoyment. I note here the contrast only which con-

sists in the attitude, but must not be sought in the facts in the face of which the attitude is taken. I ought to add that there is a serious moral background in the position of the poet of wine and love, which is worked out by Goethe in such poems as "*Vanitas Vanitatum Vanitas.*"[1] In fact, Goethe's attitude is one that in a certain sense combines the opposites of Buddha and Omar Khayyam.

In brief, we grant that there is a personal equation in the moral principle of every man, and the objective statement of facts is not the sole thing in the determination of man's attitude toward his surroundings. This personal equation is due to the character of man. But we must insist, first, that the attitude toward facts is not (as James would have it) "a belief." In a scientifically trained man the will determines the attitude towards facts but not his belief in their existence or non-existence. The will may further determine the mode of expression, but not the substance of the statements themselves. And, secondly, it is obvious that the will itself is a product of experience; it has developed from blind impulses and has been modified, trained, and educated in the school of life. Its character, accordingly, its worth, its place in the scale of evolution, depend upon the growth of intelligence, i. e., the part that reason and rational considerations play in its decisions.

THE WILL.

Far from being a metaphysical entity, which is such as it is by an act of royal arbitrariness, a *sic volo sic jubeo* (as Schopenhauer teaches) the will is a phenomenon of nature, a product of definite conditions and explicable in its origin and growth. Schopenhauer commonly characterises the will as blind, meaning thereby that it lacks rationality and spurns the acute vision of intellectual comprehension. And it is quite true that the will appears to be arbitrary in its nature. The several personalities, and generally speaking all living beings, know what they will, but, as a rule, they do not know why they will it. In other words, they are conscious of

[1] For further details and a collection of Goethe's poems in this line of thought see the author's *Buddhism and Its Christian Critics*, pp. 118–121 and 98–115.

what they are, what they desire, what they want: but they are not conscious of the conditions that have moulded their nature. They are especially ignorant of their prenatal history, which built up their physiological system, the frame of the skeleton, the muscles, the intestines, the several organs of sensation, and also the inherited traits of character. Only the present is illumined by consciousness, not the past.

The lion lives on a flesh diet because he has become carnivorous in the history of his race. He does not know why; he only feels his appetite for flesh; he hunts animals as he saw his parents do; he catches his prey and devours it. For him (if he could reason about it) there is no "why?" save his royal pleasure. He likes flesh diet, it agrees with him, he feels contented when he gets it,—in short he wills it. It is his "organic need" (to use the phrase of Professor James). Logic, or ratiocination, or scientific evidence, has nothing to do with it. To the lion the slimmest pretext of an argument would be sufficient to justify his belief in flesh diet. On the other hand, no amount of the most skilful explanation of its absolute necessity will be sufficient to induce a sheep not to condemn the lion's mode of living as an utterly immoral principle.

The example of the lion's belief in flesh diet exhibits in an exaggerated way the enormous significance of the part which the personal equation plays in the formation of convictions; and on that very account it is more instructive than an instance taken from the field of arithmetic or formal logic. No one questions the statement of a mathematician that $2 \times 2 = 4$, or that $(a+b)^2 = a^2 + 2ab + b^2$, or if all A's are B, that every single A is B. But purely formal statements, so long as they are considered abstractly, are purely theoretical. As soon as they are applied to practical life, the quarrel of dissenting opinions begins. On the very threshold of experience, the question arises whether $2 \times 2 = 4$ is true at all. There is a large contingent of able-minded, headstrong, stout-willed knights of thought who would declare that purely formal statements are not true: they are merely correct; that is to say, they are legitimate inferences only from assumed propositions.

The statement proves true in thousands of instances in the domain of our experience, but it may not hold good on Mars, where (for all we know) 2×2 may $= 5$. And geometrical theorems, far from being true, are positively false, for geometrical lines and points and surfaces are purely imaginary and positively unreal.

Such is the theory of John Stuart Mill as presented in his *Logic*, and if he is right, science loses its solid bottom and ceases to be reliable; but the loss of science (viz., exactness of argument and objectivity of statement) is the gain of the erratic escapadoes of subjectivity, of superstition and of all flights of fancy in the domain of unfounded belief.

If science (viz., objective knowledge) ceases, subjective opinion as fashioned by an arbitrary will exercises undisputed control. Thus the door is opened to either agnosticism or obscurantism.

Those who seek religion in the domain of the impenetrable night of nescience, who define religion as belief in the unknowable or incomprehensible, or even the impossible and incredible, whose motto is *credo quia absurdum*, would say here, "the loss of science is the gain of religion."

The attentive reader will notice that we speak of "superstition," not of "religion" here; for it is the point we intend to make that this conception of religion (as being based upon unfounded belief, as being a mere matter of subjective idiosyncracy and comparable to the lion's belief in flesh diet) is as false as is the method of laying its foundation upon scepticism.

The denial of the objectivity of truth which seems to be a disease that naturally develops in the period of transition from childhood to manhood, a kind of mental measles, leads in science to agnosticism, in religion to obscurantism. The agnostic argues there is no truth, and thus everyone's religious conviction becomes a matter of purely subjective attitude. The infidel scorns religion, saying, since truth is not forthcoming, let us acquiesce in nescience; and the pious rejoices at the idea that nothing can be either proved or disproved, for now he is free to believe anything he pleases. In both cases indolence triumphs. There is no need of troubling oneself with doubts, or investigating the problems of life. Since sci-

ence is not reliable, the personal equation of our own organic needs will solve for us all the problems of life. The will is king, intelligence is his hired servant. The will to believe alone can fabricate for us a religion that will suit us. Never mind what science has to say. Will is trump!

It is not our intention to moralise, but to explain. Says Schopenhauer: "To preach morals is easy, but to explain morality is difficult." Our intention is to elucidate the problem of the will. We do not renounce influencing others, but by affecting the comprehension we expect indirectly to affect the morals more effectually than by preaching.

The question of the will in both spheres, science and religion, has a far-reaching moral application. If our organic needs are the court of last appeal, we have only to know what we want and make a religion to suit us. We need not trouble, and we may let others do the thinking for us. It is a convenient and easy way of dealing with a grave problem, but the world will move on and may leave us behind. Our intellectual life will be arrested, for the correction of the will through better insight, through growth and higher development, is thus made irrelevant.

INTELLECT FORMING THE WILL.

Neither a truly religious nor a truly scientific man can find satisfaction in the assumption of an arbitrary will that uses the intellect as a handmaid only to do the bidding of the will. On the contrary: the will is (not directly but indirectly) the product of the intellect. And if the will were not amenable to intellectual guidance, whence should we take the courage to labor for progress, whence the hope that our life's work is not in vain? If the will were truly the ultimate *raison d'être* of our religious convictions and the authority of last appeal, there would be no sense in letting the light of science shine upon religion. Religion would be relegated to the dark region of the inscrutable, and there all superstitions, whether high or low, whether absurd or relatively true, whether inspiring by their moral significance or debasing by bigotry and error, would rank on the same level and be entitled to equal claims,

—for the criterion of judging them would have been removed and purely subjective, arbitrary needs would be deemed sufficient for their justification.

The will can be affected by instruction, it can be guided by education, it can be modified by experience. And though the influence of an improved insight is slow, it is unfailing.

Let us but consider the origin of the will, and we shall appreciate the paramount influence which intelligence exercises upon its formation.

Schopenhauer claims (and within certain limits he is right) that the will is unchangeable. Educators can improve the intellect of a man but cannot affect his character. A cat will have a hankering after birds, even though constant fear of punishment may restrain her from attacking the canary in his cage. *Mutatis mutandis*, a thief will remain a thief, a liar a liar, a rascal a rascal, even though fear of punishment may force him to reform: the character will remain as before, for no living being can change its nature, it can only adapt itself to circumstances and acquire the habit of suppressing certain impulses in consideration of their inevitable evil results. This is true enough, but we must not forget that the acquisition of new habits is actually a change of character. We grant that the growth of new habits is a slow process, and that the old habits are more inveterate than later accretions. Nevertheless, no one can doubt that education and experience in developing certain desirable habits modify the character.

There is no need of entering here into a discussion of Weismannism concerning the heredity of acquired characters, for we are concerned only with the facts of life and are not concerned with the theories invented to explain them. The fact is that men change their habits in life according to their surroundings and previous experience, and the domestication of animals proves that cats and dogs and cattle and pigeons can develop new species which all but absolutely lose qualities that were typical of their ancestors in a wild state, and they acquire others which become inbred and need very little training. The difference between Weismann and his adversaries is not a question of fact (for as to facts there is no

disagreement), but of theories as to the mode of operation. Most naturalists believe that acquired habits are transmitted as dispositions, and disposition grows into hereditary traits; which implies that nature selects those individuals for propagation which adapt themselves to conditions. Weismann believes that only such individuals acquire new habits as (according to their germinal predispositions) possess the faculty of adaptation to the special line required and thus selection is made of germs. The facts in both cases remain the same: there is evolution,—viz., a growth by epigenesis, a development of new additional faculties which did not exist before.

The fact remains that new types of beings are being moulded under our very eyes. Human races (like the negroes in the United States, the Japanese under the influence of Western civilisation, European immigrants to America) are modified. The process is slow, very slow, but not slow enough to be questioned. And it is experience under definitely given conditions that produces the change. Experience means intelligence, and it implies the objectivity of facts to which the subjectivity of sentiment becomes adapted. The product which is a change of character appears upon introspection as arbitrary as before; it is will, and the new type of creature acts according to its new habits because it wills to be such as it now is, and not because it argues on lines of logical deductions.

It is the logic of the influence of objective facts, not the subjective logic of pondering over problems, that moulds sentient beings. Hence the statement concerning great leaders on the path of progress that they builded better than they knew. Evolution in the animal kingdom and progress in the history of mankind is due to the influence of the reason or logic of the objectivity of facts upon the subjectivity of the will, of character, of sentiment. Thus sentiment, and with it character and will, are slowly but surely modified by reason.

Sentiment, character, and will are for the present purpose identical, for character is a name of the general tenor of will-impulses, and will is merely the dynamic aspect of sentiment.

EVOLUTION OF SUBJECTIVITY.

The evolution of all life must have started with simple impulses of sentient substance, and these blind impulses are the result of an internal state of irritable matter; they are due to the physical need of hunger. A need is felt as a want, and the want is an incipient will. The want incites irritable substance to activity, and a blind search for food is made. The want is sooner or later satisfied, leaving a trace of the pleasant experience, which is a predisposition for a repetition of the same process. Innumerable actions of the same kind shape the life-substance in adaptation to its surroundings. The constant touch with a surrounding medium produces a follicle or enveloping membrane with an aptitude to contract upon touch; the constantly repeated impact of ether-waves is responded to in places most exposed to them, viz., in front, and the traces of this constantly repeated response develop specks sensitive to light, called ocelli, or primitive eyes. Thus the environment shapes the several creatures, and their will is nothing but the response to given conditions. The subjectivity of every being is due to its place of growth in the objective world.

And what a bewildering multitude of forms exists in animate creation! There are innumerable bacilli, bacteria, and spores fungi and microbes. We have protists which cannot as yet be classified either as animals or plants. There are innumerable varieties of lower life, but the number of forms rather decreases with their ascent; fishes, birds, amphibia present stately groups of families, fully known only to specialists. The mammalia are sufficiently limited in number to be generally pretty well known. But when we come to the highest type, the rational animal, we have one genus only, which is man. There are about half a dozen human races, but the black and the white, the yellow and the red races differ from each other less (as regards race characteristics) than the St. Bernard from the dingo. The races of man are not *genera*, but *species*.

It is true that within the unity of the human genus there is a

great variety of individual differences, almost as great as, or perhaps even greater than, the variety of genera on the lowest scale. Still it is one genus only. This contrast between the higher and lower stages of evolution is characteristic, because it points out the power of the oneness of the aim, or goal, or ideal. This ideal of animal life is not imposed upon it as an external purpose in the old sense of the doctrine of design, but inheres in nature as an intrinsic teleology, a direction which evolution takes because it is determined by law, i. e., the immanent world-order of uniformities which naturally lead all creatures to develop toward rationality. We do not deny that on other planets other kinds of rational beings may exist; they may be winged, their organs of locomotion may be different, and they may have additional sense-organs, but they will have the same reason, and (leaving out the decimal system as accidental) the same arithmetic, the same mathematics, the same logic. There is one law only in the world which in its purely formal relations is the condition of all uniformities in the world, and corresponding to this one law there is one reason only and there can be only one ideal of rationality for rational beings. This ideal, being founded upon the objective fact of uniformity in the world-order, is an objective factor; it is the factor that moulds the intellect of living creatures, and, by moulding the intellect, fashions the will.

Will (properly speaking) is never blind, as Schopenhauer says; will develops from blind impulses, but it becomes will only by the light of intelligence which is nothing but subjectivity regulated by a recognition of the objective world-order, viz., the eternal law of being in which existence is moulded.

The idiosyncrasy of the will is unquestionably the most powerful factor in belief, religious as well as ethical. All creatures that can speak are apt to fashion their rules of conduct according to their character, the preservation of which is to them an organic need. And yet, however stable a character may be, it is not absolutely stable. There is back of it the influence of experience which is little recognised and much misinterpreted, working constantly in one and the same direction toward a recognition of the factors that shape us. The result is first a rational being with the eggshell of

superstition still clinging to him and then the completion of the rational ideal in the man of scientific insight.

SCIENTIFIC INSIGHT.

We say purposely "man of scientific insight," not "scientist"; for science is the method only, the instrument by which we realise the aims of mankind, the ideal of existence toward which evolution tends. The scientist is the hod-carrier who furnishes the materials for a scientific conception of existence. It is not probable in the advance of civilisation that all men will become scientists, but it is quite within the scope of probability that in a future condition of society all people will be possessed of scientific insight, and as soon as that stage is attained, we shall understand that above the organic need of a will to believe, there is an objective norm which shapes and moulds in the furnace of evolution the organic needs of beings, and those creatures whose organic needs are not amenable to the quiet promptings of the lessons of life will be sifted out and discarded.

Organic needs remain the court of last appeal to the rational but prescientific man. The prescientific man finds rest and peace in the thought that a certain belief is satisfactory to him, because it suits his idiosyncrasy. The man of scientific insight goes farther; he seeks his foundation in the eternal conditions that have shaped his will and thus he is enabled to grow beyond his present size. All creatures have this chance, and it is a positive fact that all creatures do grow by experience in the school of life. For it is this growth which makes evolution possible. But the man of scientific insight ceases to cling to what he is at a given moment, and thus he acquires the power of conscious growth.

In the prescientific man there is a resistance to growth and this resistance to growth is beneficial as a conservative principle: otherwise growth would not be steady, but erratic. When the stage of scientific insight has been attained, there is no further danger of haphazard advances, for then changes being based upon a clear comprehension of facts imply fewer risks and thus there is less fear

of going astray, which implies a calm confidence and a well-directed courage.

THEOLOGY.

But what has an exposition of the evolution of will to do with theology?

Very much indeed! If religion is in its most significant period of growth a condition of belief, and if in this period belief depends upon our organic need, i. e., upon the will to believe, the gradual disappearance of the subjective factor and its replacement by a recognition of the objective norm in which our will is moulded must finally transform the old theology, the pseudo-science of subjective beliefs, into a new theology, viz., theology as a genuine science. The latter is the natural outcome of the aspirations of the former as much as astronomy issues from astrology and chemistry from alchemy. We might call the new theology by a new name to distinguish it from the old theology of bygone ages, but if the transition be a peaceful change there will be no need of a new name.

We might call the new theology "theosophy," had that beautiful name not been monopolised by the theosophists whose most prominent representatives seem to be bent on continuing the errors and vagaries of the old theology without actually attaining the higher ground of the truly scientific spirit; they introduce newfangled extravagances and return at the same time to errors that have been discarded.

We might call the new theology "theonomy" (in analogy to astronomy) were it not for the fact that the ending "logy" in the sense of "science" is literally quite correct, and even "astrology" would according to its etymology be the correct term for the science of the stars. But if the term were accepted it would serve its purpose.

The new theology (or if you please "theonomy") is a new science the roots of which lie partly in philosophy, partly in a scientific treatment of history, partly in ethics, partly in an application of art, and partly also in poetry and belles-lettres, the religious literature being to a great extent hymns and recitals. The basis of

theonomy is an appreciation of the factors that shape our ends, viz., God.

The name God remains quite as appropriate for the new conception of the eternal norm of being as it was for the old. The notion of a divine personality which the term conveys is as little objectionable as is the occasional personification of nature which now and then occurs even in strictly scientific books. For there is a good reason for anthropomorphism, and if it is only understood as such, there is no need of taking offence at it. Moreover, the eternal norm of being is actually a harmonious totality of laws of nature, a system of truths, a spiritual organism, or a body of immaterial influences which condition all the details of becoming, and these creative factors of life are omnipresent as they are nonmaterial; they are eternal as they are indelible; they are immutable as they are perfect, and beyond the possibility of being improved, forming the unchangeable bedrock and ultimate *raison d'être* of existence.

But theonomy, the new theology, is not merely philosophy: it is complicated by a consideration of the positive forms of religion as it has historically developed on earth. It is history when tracing the evolution of religion from Egypt and Babylon to Palestine, from Palestine to Rome, from Rome to Germany, England, and America. It is in need of philology and literary criticism when it restores the old sense of the literature of the several religions. It partakes also of the nature of the descriptive natural sciences. It enters into psychological investigations when inquiring into the source of religious phenomena, e. g., the practice of sacrifice, of slaughtering animals, and in savage times even human beings, on the altars of the gods. It trespasses upon the territory of folklore and anthropology when tracing the development of purer views from superstitions, of moral convictions from barbarous customs, of scientifically tenable notions from a belief in magic and other errors. It partakes of the methods of the educator when applied to the practical needs of present morality. It is a grand and noble science, and the scope of its development is of infinite potentialities.

THE FUTURE OF RELIGION.

Those who speak of the irreligion or non-religion of the future have seen one side only of the religious life of the present age, viz., the decay of certain dogmatic features of the old theology and the palpable untenableness of the old position of dogmatism with its *credo quia absurdum*; they are limited in their field of vision to one aspect only and have not seen the actual growth that is taking place in the minds of theologians holding chairs of theology at the several universities of both hemispheres, and also in the hearts of religious congregations, especially of the Protestant Churches of the United States. The future of mankind will not be less religious than the past; it will be more religious; that is to say: its religion will be as much purer than the decaying credos of to-day as monotheism was better than the polytheism which it succeeded.

The present age is a time in which frequent demands are being made for a revision of creeds, and the Presbyterian Church has gone so far as to make a few important changes, and it is remarkable that the delegates were practically unanimous.

Obviously modifications in the formulation of our religious tenets have become desirable, because our comprehension has expanded and our field of vision has been enlarged as well as deepened. This change, however, is not a symptom of decay and death, but of growth and life. We find it necessary to discard the old dogmatism. Yet while dogmatism should go, dogmas (or rather doctrines) should stay, and they will stay. That is to say: our attitude toward the traditional confessions of faith, our interpretation of them, our views concerning their letter and the relation of the letter to the spirit, has changed, and the change actually consists in a better knowledge of their spirit.

Thus the future will not be less religious but more religious, and our religion will be purer and nobler and truer.

We shall understand the way in which the intellect modifies the will, and we shall see the justice of interpreting the traditional dogmas in the light of science. We need not drop the symbol as

a myth, when we begin to understand its significance, nor need we abandon the name and conception of God when we learn that God is not an individual being, but a superpersonal omnipresence.

Religion, far from being abolished, is at present in a stage of growth. Its horizon is expanding, but instead of losing anything, we are gaining. Theology changes into theonomy, which is not a surrender of the old orthodoxy, but its fulfilment and completion.[1]

THE REVISION OF CREEDS.

Now it may seem strange that supposing I myself had been a delegate to the Presbyterian assemblage or committee, I should (in spite of my radical position and advanced views) have voted against a revision of the creed. And why? Because I would propose another course which seems to me more recommendable.

To revise creeds seems to imply that their formulation in a past age was a mistake, and I think it was not. A creed is a formulation of faith as understood at the time of its formulation and under definite historical conditions. We can understand the spirit of a creed only after a close study of the history of the time which gave birth to it, and to adapt a creed of the past to the needs of the present must forever remain patchwork. And it would be wrong to tamper with creeds, for they are historical documents and should be as little altered as we would change the text of ancient monuments.

The revision of a creed, too, is an historical act, and so the changes adopted indicate a change in the religious attitude of a Church, but it would have been preferable to leave the old confession alone.

In place of a revision I should have proposed a new statement made of the spirit in which the present generation views the con-

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[1] The change pointed out here does not lead to agnosticism or negativism of any kind, but toward the establishment of a positive science of religion, including the nature of God. While we grow broader, we become more tolerant and sympathetic with other conceptions, but also more definite in comprehending the truth, viz., the orthodox solution of religious problems. For details see the writer's article "The New Orthodoxy" in *The Monist*, Vol. VI., No. 1, and in *The Dawn of a New Era*, p. 21 ff.

fessions of faith in the past, and my proposition, which I trust would be acceptable to the most orthodox wing of the Church, would read about as follows:

WHEREAS, divine revelation is the unfoldment of truth;

WHEREAS, God speaks to mankind at sundry times and in divers manners;

WHEREAS, Jesus Christ spoke to us in parables, and the Christian confessions of faith are, as their name implies, symbolical books;

WHEREAS, religion is a living power and life means growth;

WHEREAS, that is the true light which lighteth every man that cometh into the world; and finally

WHEREAS, centuries of unparalleled growth have added much to our better comprehension of religious truth:

THEREFORE, be it resolved that we, the duly elected representatives of the Presbyterian Church, declare

That we regard the Westminster Confession of Faith and other formulations of belief in ages past contained in the symbolical books, as venerable historical documents which were, from time to time, on certain occasions, and for specific purposes, composed by the legitimate and legally appointed representatives of our Church;

That we justify the spirit in which they were written, but deny that they were ever intended to bar out from us the light that the higher development of science and the general advance of civilisation would bring;

That we bear in mind that the symbolical books are symbols, and that we have learned that a freer scope for their interpretation in the light of the maturest science of our age will do no harm to the essential doctrines of our faith.

This declaration would bestow the necessary liberty of conscience on Presbyterian ministers without involving the change of a single letter in the Westminster Confession and without causing a break in the historical tradition of the Church.

While I am radical in my principles and do not hesitate to apply my radicalism to practical life, the very recognition of evolution as an essential truth in the interpretation of the development of man teaches me to be conservative. Such a radicalism as would tear down religion on account of some antiquated expressions is shallow and will not prove wholesome. It is a spurious radicalism. We must learn to comprehend the old formulations of faith from the standpoint of the old times. We must recognise the sincerity of our fathers and appreciate the work they did. Let there-

fore their work stand *as theirs*. On the other hand, we must not allow the dead to govern the living, and the past to cripple the life of the present.

It is true that the authors of the Westminster Confession fondly imagined that their statement would prove acceptable to all the generations to come; they did not consider the needs of the twentieth century. But that narrowness which characterised them is a trait of their age and we cannot appreciate the moral worth of their zeal unless we bear in mind their limitations.

The Huguenots endured most dreadful persecutions, they were exiled from France, they lost all their worldly possessions in their old homes; but they carried with them confidence in liberty, boldness of enterprise, good schooling and knowledge, sound methods of education, thrifty habits, energy and endurance. It is no accident that they became prosperous wherever they went. History is their justification. We make ourselves worthy of the heirloom of their deeds, not by clinging to their limitations, but by imitating their boldness of spirit and their love of truth—of the truth as they saw it—which made them rise in rebellion against the tyranny of the letter of the established Church institutions.

When we lay our hands on the plow, there is no need of looking back. We should learn to understand the past, but we should live within the living present; and we of the present have the same right to think, to learn, and to grow as our ancestors had. We have the same right to reform the Church as they had, and also to formulate our views of religious truth in terms that will suit the needs of the present time. We are their descendants; our faith is the outcome, and in part the product, of their religious development, and if it is not the same in letter, it is the same in spirit. Our faith is their faith; but it is their faith matured by the increased experience of several centuries. There is no need of tampering with their statements and of changing their confessions of faith. If we only recognise our own right to read the old doctrines in the new light, we shall be more just to them and give them a better interpretation which at the same time will be better adapted to the conditions under which we live.

Religious truths were formulated for the sake of rendering clear the situation in which they were written, but they were never meant to arrest mental development. The men who wrote the Westminster Confession would not express themselves to-day in the same terms as they did then. In their days they reformed the Church, because they insisted upon their right to think, to learn, and to grow; they would not to-day be prevented from acting on the same principles, and under changed conditions they would express their faith in other terms. Let us follow their example and so prove ourselves to be their faithful successors, their legitimate heirs and true children, not in the letter, but in the spirit.

What is true of the Presbyterians holds good for all Churches. There is no need of revising dogmatic formulas or tampering with any confession of faith. Let all creeds stand as they read and treat them as historical documents; but when you feel that you have outgrown the letter of your religious traditions, remember that creeds are symbols of your faith, not absolute truth, and insist on your right of interpretation.

We need elasticity in our religious life as well as stability. The right of interpretation gives both: It frees us from the bondage of the letter that killeth, yet preserves the spirit. It allows a great scope to liberty on conservative principles and favors growth without producing a break, thus rendering evolution possible where otherwise a revolution would be necessary.

EDITOR.

THE CREATION-STORY OF GENESIS I.

A SUMERIAN THEOGONY AND COSMOGONY.

MYTHS IN THE BIBLE—is a subject which has recently received the greatest attention from Biblical scholars. Professors Gunkel[1] and Zimmern[2] have investigated the subject in its various aspects, and Dr. Paul Carus[3] has discussed it so thoroughly that hardly anything is left which has not been adverted to by them. The following investigation is based upon a direct study of the ancient Babylonian inscriptions, though the results reached by my predecessors and a thorough acquaintance with their method of investigation is presupposed here. For the sake of completeness, however, I may be permitted to recapitulate in a few words the chief data brought out by their investigations, confining myself here to the myth of the first chapter of Genesis.

The original account of Gen. i. must have contained the so-called Jahveh-Tehom myth found in other parts of the Old Testament. This myth represents Jahveh as fighting with a dragon, called either Rahab or Leviathan or serpent. Jahveh overcomes this dragon, divides it and forms out of the two halves "the waters that are above the firmament" and "the waters that are below the firmament." The Biblical dragon has been identified with the

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[1] *Schöpfung und Chaos in Urzeit und Endzeit.* Göttingen, 1895. Also his new *Commentary on Genesis* (the *Introduction* has been published by the Open Court Publishing Co., Chicago).

[2] "Biblische und Babylonische Urgeschichte" in *Der alte Orient*, Vol II., Heft 3. Leipzig, 1901.

[3] "The Fairy-Tale Element in the Bible," in *The Monist* for April and July, 1901.

Babylonian Tiâmat, a monster which was overcome by the god Marduk, the god of light, and which was likewise divided in twain. Further the fight of Marduk with Tiâmat was recognised as the original of the fight of Jahveh with Tehom: a fight of the light against the darkness. The darkness having been overcome by the light, the creation became possible. The following striking similarities were found to exist between the Biblical and Babylonian myths[1]:

According to both traditions there was in the beginning nothing but the chaos under the form of the primeval ocean—it was eternal, not having been created. This ocean, when personified was thought to be a terrible monster. The Babylonian name of that monster was Tiâmat, the Biblical Tehom or Leviathan-Rahab.[2] That in Gen. i. this Tehom was considered a mythical being is still evident from the fact that the word is treated as a "proper name" —it is simply called Tehom and not ha-Tehom. In both myths this Tehom is represented as a dragon or serpent, either with one or several heads, presumably seven as in Revelation, chapters xii. and xiii.

Besides the chief monster there appear in both traditions *others: its helpers.* In the Babylonian creation-story there are opposed to these monsters the "great gods" among whom Marduk takes the first and foremost place. Also in the Biblical account there seem to have been, besides Jahveh, other divine beings, as is still evident from Gen. i. 26: "Let *us* make man." In the Babylonian account it is Marduk who takes up the fight with Tiâmat; in the Biblical account the same rôle is played by Jahveh. Both are armed with a sword. Marduk kills with his sword Tiâmat, Jahveh Rahab-Leviathan-Tehom. The "helpers" of Tiâmat are treated more kindly by Marduk, precisely as is done with the helpers of Rahab by Jahveh. According to both myths the monster is divided—according to the Babylonian account: into the upper waters and into the lower waters. The upper waters are kept back by a kind of

[1] See Zimmern, *l. c.*, p. 15. Gunkel, *Commentary*, p. 85 f. Carus, *The Monist*, April, 1901, p. 428.

[2] ψ lxxxix. 9 ff. ψ lxxiv. 13 ff. Is. li. 9 ff. Job xxvi. 12 ff.; ix. 13 ff.

barrier and by watchmen, who are "not to let out the waters." According to the Biblical account Jahveh divides the Tehom, the primeval ocean, also into two parts, by putting a firmament between them. Thus the Tehom came to be a heavenly and a terrestrial ocean, or as it is said in the Bible, "waters which were above the firmament" and "waters which were below the firmament." Even the watchmen who are to guard the waters of heaven are still preserved in Job vii. 12:

"Am I a sea or sea-monster that thou settest a watch over me?"

By thus dividing the primeval ocean there is created according to both myths the visible heaven. In the Bible as well as in the Babylonian account this fight with the dragon is closely connected with the creation of the world, in such wise that the former precedes the latter. In both accounts we have the following sequence: Tehom—Fight—Division—Heaven!

The above is a *résumé* of what scholars have arrived at in their investigations, and I think their conclusions may be accepted as true. But, far as they have gone, they have by no means as yet exhausted the subject. There are still left certain difficulties in the Biblical as well as in the Babylonian account which are not yet satisfactorily explained. And with these unsolved problems we are concerned here.

Before we consider these problems it would seem necessary to say a few words about the structure of Gen. i.

The first chapter of Genesis is ascribed by all scholars to the Priestly school (commonly abbreviated P.)—and is hence late. The word אלהים (Elohim) is used throughout for "God" and the account is built up according to a certain formula. This formula runs:

"And Elohim said: let there be . . . and there was. . . . And Elohim saw . . . that it was good. And there was evening and there was morning the . . . day."

According to this skeleton the creation of the world is described as having taken place within a space of seven days. This system of seven days is not original, it is not found in the Babylonian account. It was inserted by P. This follows from the fact that on

the third and sixth day two tasks were done, and that on the seventh day, which was intended to be a day of rest, Elohim had to *finish* the work of the sixth day: ויכל אלהים ביום השביעי מלאכתו אשר עשה[1] —and if he *finished* it, he had to *work* on it, it was not at an end, not yet done on the sixth day! But, as we shall shortly see, there is still another reason why the system of seven days cannot have belonged originally to the account of the creation.

Furthermore, I should like to point out here the difficulty which we encounter when trying to translate the word הארץ. It is used in three different senses in the first ten verses. In the expression, את השמים ואת הארץ, it is used to express our idea of "cosmos," for "heaven and earth" is simply the Hebrew term for our word "cosmos." In the expression, והארץ היתה, of v. 2, ארץ stands for the chaotic mass; it is the cosmos as it existed *before* the first day. And v. 10 ארץ is explained by יבשה, "the dry ground"; here therefore it is the same as that which we should understand by "earth." Bearing this in mind, we ought to translate verses 1—3 as follows:

"In the beginning of the Elohim's creating[2] heaven and earth (i. e., the cosmos)—the chaotic mass existed,[3] namely,[4] as a tohu vabohu, and darkness was upon Tehom and the spirit of Elohim מרחפת upon the waters—then Elohim said:" etc.

With this translation, of course, falls also the theory of a *creatio ex nihilo.* Indeed, a creation out of nothing is not implied in the first chapter of Genesis. Not a single word indicates such a theory—not even the word ברא—for we have instead of ברא in verses 25, 26, the verb עשה. It was the chaotic mass coeternal with the Creator out of which everything was created, made, developed, evolutionised. After the primeval ocean has been divided into the waters above and below the firmament, the earth or dry land is made to "appear out of the waters under the firmament": ותראה

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[1] Gen. ii. 2.

[2] Or, "In the beginning when Elohim was about to create."

[3] היתה = "existed," not ויהי or "became."

[4] Sc. at that time, i. e., "in the beginning."

היבשׁר! Even the birds are developed or take their origin from out of this terrestrial ocean:

ישׁרצוּ המים שׁרץ נפשׁ חיה ועוף

"Let the waters swarm with swarms of living creatures and with birds."[1]

We see then, that one thing takes its origin out of the other, one is the parent of the other; there is, so to speak, a continual giving birth of one thing to another,—a *genealogy*.[2]

Having thus cleared our way, we must now consider the *differences* between the Biblical and the Babylonian account of the creation,—differences that are certainly strange and marked. If it be true that Gen. 1 originally made use of the fight of Jahveh with Tehom, we must be able to account not only for its omission, but also for its differences from the Babylonian Marduk-Tiâmat myth. And just these differences are, for our consideration, of the highest importance!

According to the Babylonian account, the creator Marduk was *himself borne* by Tiâmat,—he therefore was not coeternal with Tiâmat, he was, so to speak, her child! The Creator of Gen. 1, on the other hand, exists from all eternity like Tohom herself! The *first* act of the Babylonian creator is the "division of the Tiâmat," i. e., the creation of "the upper waters" and "the lower waters"! The first act of Elohim of Gen. 1 is the creation of the אוֹר or light.

Now, what is the significance of this אוֹר in Gen. 1? It is

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[1] Gen. i. 20.

[2] The writer of Psalm civ. 24 ff. was, no doubt, later than P., since for him the eternity of Tehom-Leviathan seemed to have been impossible. Jahveh alone could be eternal,—hence Leviathan had to become a creature, for we read (R. V.):

"O Lord, how manifold are thy works!
In wisdom, thou hast made them all:
The earth is full of thy creatures.
Yonder is the sea, great and wide,
Wherein are things creeping innumerable,
Both small and great beasts.
There go the ships,
There is *Leviathan*, whom thou hast formed
to take his pastime therein!"

The original significance of Leviathan is lost here,—he has become a mere creature of Jahveh! Hence also the succession: creation of the earth with its creatures and the sea with its creatures, among them Leviathan!

neither the sun nor the moon nor any of the stars,—for they were all created later: on the fourth day! And yet it is said in v. 4 that Elohim by thus creating the "light" *divided* the "light from the darkness"; the former he called "day," the latter he called "night." Now this is in direct contradiction to v. 14 and v. 18, where we are expressly told that Elohim created the "two great luminaries," i. e., the sun and the moon, "to rule over the day and over the night and to *divide the light from the darkness*"! According to our daily experience and observation, it is the *sun* which conditions "the light and the darkness" or "the day and the night." If this be true, then it follows that the statement in v. 4 about the "light" of the first day is wrong. And so it is! We saw above that the system of seven days does not originally belong to the creation story. The writer of Gen. 1, however, in order to fabricate his nights and days or simply "days" before the sun was created, *had to add* some such expressions as those found in v. 4: "to divide the light from the darkness." In doing this, he manufactured the first three days,—*the days*, namely, which preceded the creation of the sun on the fourth day. And because it was *added*, it follows that v. 4 and all of v. 5 does not belong to this account. But this consideration does not yet explain the "*light*" itself, created by God on the first day.

In vain have I looked in the various commentaries for an explanation,—the explanations given, if they may be called such, do not explain! Here again the Babylonian account helps us. According to that account Tiâmat brings forth "the great gods," among whom the *god of light*, Marduk, was the chief one, and this latter overcomes Tiâmat and thus creates the heavens. In Gen. 1 the monotheistic idea predominates; the conception of divinity that the writer had, did not suffer the Creater himself to be created,—hence what did the writer do? Well, "the great gods" were eliminated, the creator Marduk was called Elohim (or Jahveh) and was made coeternal with Tiâmat and placed with her at the beginning, —but only the NAME, *the nomen proprium of the creator was removed*, his attribute was kept: the attribute "*light*"! And it was kept because the writer NEEDED it to make out his DAYS! Hence the

"*light*" of Gen. 1, 4, because it is neither the sun nor the moon nor any of the stars, can be only the *attribute of Marduk*, as the god of light and the foremost of all gods. The "*light*," then, must be *another*, and the most important, mythological element taken from the Babylonian account by the writer of Gen. 1. Marduk, the "god of light," is the "*conditio sine qua non*" without which the creation would have been impossible,—the writer thought. The name Marduk had to be given up, but his attribute could be kept and was kept and made the *first work* of Elohim.

From these considerations we get the following sequence:

(*a*) Babylonian:

Tiâmat—"the great gods," and Marduk, the *god of light* —fight—division—heaven.

(*b*) Biblical:

Tehom—light—fight—division—heaven.

In the Babylonian account the *primeval ocean* is a monster of double sex: a masculine and a feminine in one person, a kind of androgyn, for we read:

"E-nu-ma e-lish la na-bu-u sha-ma-mu
shap-lish ma-tum shu-ma la zak-rat
apsû-ma rêsh-tu-u za-ru-shu-un
mu-um-mu ti-amat mu-al-li-da-at gim-ri-shu-un
mê-shu-nu ish-ti-nish i-chi-qu-u-ma."

That is:

"When above | the heavens were not yet named
Below the earth | no name as yet bore
When the *ocean*, the primeval | their *begetter*
Tiâmat, the deep, | the *mother* of them all
Their waters in one | had joined together
Then the great gods were created."

According to this the primeval waters consisted of the *apsû*, the *begetter*, or zârû,[1] and the *Tiâmat*, the *mother* or muallidat. As a result of the "joining their waters in one," i. e., of cohabitation, the gods were created. The primeval ocean, then, was considered to be the *first parent* who brought forth the gods. What does the

[1] From the root זרע "seed"!

Bible say to this? The verse which speaks about the primeval waters consists of three clauses—the first clause gives the description of the primeval waters or chaotic mass and the other two clauses stand in the so-called parallelismus membrorum. It reads (v. 2):

והארץ היתה תהו ובהו
וחשך על־פני תהום
ורוח אלהים מרחפת על־פני המים

That is, "the chaotic mass (or primeval waters, ocean see above!) existed as a tohu-vabohu; it was 'a darkness' upon the *Tehom* as well as a 'spirit of god' that מרחפת upon *the waters*."

If the Hebrew Tehom is equal to the Babylonian Tiâmat, then "the waters" must be the "apsû." But if "the waters" are the "apsû," then "the spirit of God" must be it too! This follows from the parallelism. Hence "the spirit of God" of Gen. i. plays exactly the same rôle as the apsû of the Babylonians, i. e., he מרחפת the Tehom. The word מרחפת is declared by the newest commentators to mean "to brood over"—but I do not think that that translation exhausts its full meaning; מרחפת means and stands for the same "idea" expressed by the Greek ἐπισκενάζειν, i. e., "to overshadow." Thus we get here a striking parallel to "the Holy Ghost overshadowing Mary." מרחפת, then, expresses the same thing as does the Babylonian "joining their waters in one."[1] If this be true then even in Gen. i. we find the thought expressed that the primeval waters or ocean are *parents*, who beget and would bring forth!

Thus here we have another striking similarity—notwithstanding its great difference—between the Biblical and Babylonian accounts of the creation! In both accounts the primeval waters were thought to be a kind of androgyn, male and female in one person, who thus became the first parents.

The writer of Gen. i. who apparently did not believe in an androgynous monster, retained the Tiâmat or Tehom, but substituted for the apsû "the Spirit of Elohim"[2] as the life-giving power of

[1] From this it also follows, of course, that the expression has nothing to do with the world-egg theory, which some scholars want to find here.

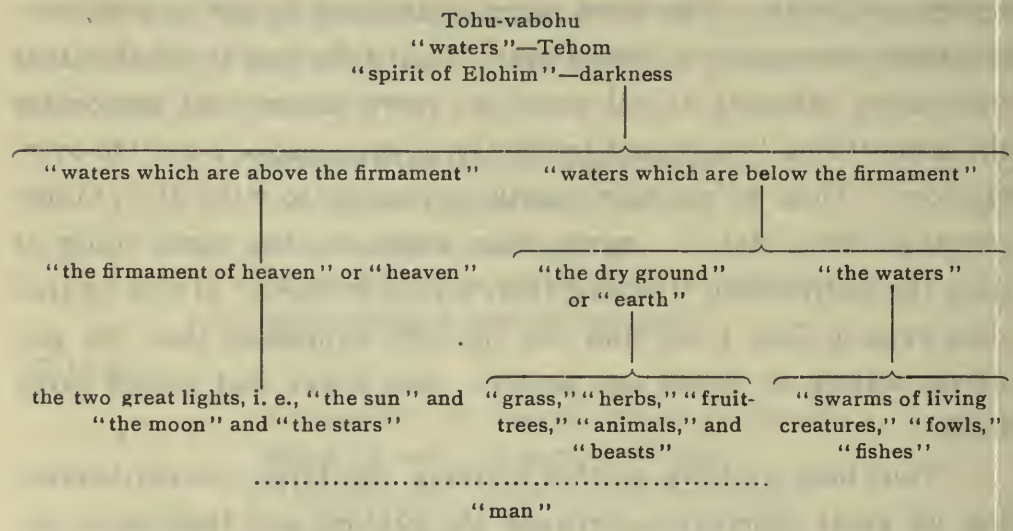
[2] The expression "spirit of Elohim" seems to stand in P. for the same idea as

everything. He wanted, it is true, to eliminate the androgynous character of the primeval ocean—the result we know.

Again if the Tehom is = Tiâmat, then חשך (the darkness) must be = Tiâmat too. Thus it was rightly said that the fight of *Marduk* with *Tiâmat* is nothing more or less than a fight of the *light* against the *darkness*.

But we have seen above that the god Marduk was called Elohim and made coeternal with Tehom, and that simply his *attribute* was retained by the writer of Gen. i. in order to help him to fabricating his days. We also have seen that the functions of the אור are in contradiction to those of the sun, and thus must be spurious, i. e., אור does not belong to the original account of Genesis;[1] it *must be left out*, if we would restore Gen. i. to its original text.

Bearing this in mind the account of Genesis i. contains a well connected genealogy, which is as follows:


Tohu-vabohu
"waters"—Tehom
"spirit of Elohim"—darkness
"waters which are above the firmament"
"waters which are below the firmament"
"the firmament of heaven" or "heaven"
"the dry ground" or "earth"
"the waters"
the two great lights, i. e., "the sun" and "the moon" and "the stars"
"grass," "herbs," "fruit-trees," "animals," and "beasts"
"swarms of living creatures," "fowls," "fishes"
"man"

I would draw the reader's attention here to the fact that "the waters above and below the firmament" are said to come from the Tehom, or the darkness,[2] a peculiarity which will be explained later on.

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the מימרא of the Targums! It was used in order to avoid as much as possible the "anthropomorphic idea" of God.

[1] If it did it ought to be made coeternal with Jahveh-Elohim, as Marduk was. But this would again be fatal—for in that case it would not be the first act of Elohim!

[2] (1) ויבדל אלהים בין האור ובין החשך.

From the analogy above given it will be seen that "man" or the "creation of man," if we take our stand on the account of Gen. i., cannot be referred either to one or to the other side, i. e., we do not know whether he was a descendant of the "waters above the firmament" or of "the waters below the firmament," from which latter the "earth" and its "creatures" took their origin. All we learn is this: "man was created in the image and likeness of Elohim"—a ἓν διὰ διοῖν, which tells us that man looks exactly like Elohim.[1] The Babylonian account tells us that man was made out of divine blood mixed with earth. The writer of Gen. i. with his monotheistic idea could, of course, never admit that the "blood of another god" was spilt—because there existed no other god. But he apparently accepted the idea that man was in some way or another connected with the gods, hence he made him to be created in the image and likeness of Elohim. The account given in the second chapter of Genesis has, however, for "image and likeness" the "breathing into man's nostrils the breath of life," which was done by Jahveh. In blood there is life, and life is a breath,—was the faith of the Jahvistic writer. Accordingly he substituted for the blood of God the "breath of God," thus connecting "man" again with his creator.

We have seen then that the fight of the light against the darkness does not belong originally to the account of Gen. 1. But, one may rightfully ask, if it does not, how are the apparent indications of such a fight to be found in Gen. 1 to be explained? To answer this question it will be necessary for us to examine the Babylonian account of the creation and see whether the original form of that account contained the fight of Marduk with Tiâmat or not.

That the Babylonian creation story had its development and required time to assume the shape in which we now know it, is of course self-evident. If we are able to trace the different threads in the development of the Hebrew literature by employing critical

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[1] Comp. here Gudea's dream where dingir Nin-Gir-su is said "to be a man," i, e., where a god is said to look "like a man."—This, no doubt, is the older conception: gods always look like the men to whose tribe or nation they belong. See below.

methods, I think we ought to be able also to trace the threads,—delicate and flimsy though they are,—which the inscriptions of early Babylonia put into our hands. In the following then I shall try to show that even the Babylonian creation story did not *originally* contain such a myth as the fight of Marduk with Tiâmat.

* * *

We have now to crave the reader's indulgence for a rather technical discussion of a few points which at first sight may seem indifferent; but this course of procedure is indispensable for an analysis of the creation-story of Genesis. Having established the genealogical order of the Babylonian divinities, we shall be better able to understand the kinship between the Hebrew Genesis and the Sumerian cosmogony.

Before entering on our investigation, it is necessary to say a few words about the meaning of NIN, EN, LUGAL, and DINGIR.

In the "trilingual list of gods," II R 59, we read in Col I, l. 48:

^{dingir}MUL DIN-TIR-^{ki} | ^{dingir}NIN-DIN-TIR-^{ki} | ^{dingir}AMAR-UD

The ^{dingir}AMAR-UD is Marduk. Marduk was the city-god of Babylon. But—and this is important—he is not called in the "Sumerian" column EN but NIN. This NIN is rightly transcribed in the EME-SAL column by U, i. e., MUL or UMUN = lord. Hence NIN must mean here = bêlu or "lord." This does not prove that Marduk as the city-god of Babylon became a "feminine." He retained his gender and remained a male deity, for in the same list, Col. II, l. 17, we read:

^{dingir}MUL (fem.!) DIN-TIR-^{ki} | ^{dingir}NIN-DIN-TIR-^{ki} | ^{ilu}Be-lit ^{alu}Bâb-ilu-^{ki}!

NIN, then, in this connection, i. e., when used with the name of a city,[1] may stand either for bêlu or bêltu, i. e., for *his* lordship,

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[1] Forming with the name of the city a "proper name" as in ^{dingir}Nin-Gir-su or standing in apposition as in K. B. III[1]. pp. 24, 46. ^{dingir}Dumu-zi-zu-ab, nin Ki-nu-nir-^{ki}!!

or *her* lordship. In most cases we will be able to determine exactly the gender either from the syllabaries or from the "apposition" that may follow such a name, as for instance, ^{dingir}NIN-EN-LIL-^{ki} is explained in the very same list by "the wife of Ninib."

The ^{dingir}NIN-GIR-SU is called in the oldest Babylonian inscriptions the ur-sag or ur-sag lig-ga, "the mighty prime minister" of Bêl,—hence the city-god of Gir-su must have been a male divinity. It is indeed strange that male gods, when becoming gods of certain cities, should be called NIN; we should expect of course for NIN either EN or LUGAL. EN—as far as I know—is never used in this connection, but only LUGAL, see, e. g., the name ^{dingir}LUGAL-ERIM-^{ki}. The EME-SAL texts distinguish clearly between the gender by using two different signs, but not so the Sumerian of the lists or bilingual inscriptions,—and also not the old Sumerian. This latter, when intending to make the gender absolutely certain, uses for NIN the word LUGAL. LUGAL then always denotes a male, while NIN may stand either for a male or a female divinity. What may possibly be the reason for the use of this NIN?

We know that in Babylonia every city had its *special god.* As long as the city was in possession of her patron she enjoyed independence. But in case the "god left the city," or "went out of the city," i. e., when the god was carried away captive by a victorious king, the city lost her independence. The city-god, then, was something which had to be defended and protected, which had to be fostered and cared for, but which could also be "taken," either by force, inclination, or otherwise, which could be chosen, betrayed or given away, which could be sold,—all characteristics of a woman! Even we are in the habit of personifying our nations as feminine; note, for example: Helvetia, Bavaria, Borussia, Germania, Britannia, and Columbia!

From this also follows that a name like ^{dingir} Nin-Gir-su is no proper name but a surname or attribute. This is even grammatically indicated in the oldest inscription, for we find very often after the name ^{dingir} Nin-Gir-su the double postposition KA-GE. In this re-

spect Galet A of Eannatum[1] is especially interesting. Compare, e. g., such expressions as these:

"Eannatum....à-sum-ma dingir Nin-Gir-su-ka-ge, i. e., Eannatum....to whom power was given by (ge) the lord of (ka) Girsu."[2]

Such surnames or attributes of gods are very common, yes, we may rightly say that all the names of the gods we know are really not proper names at all, but attributes or appellatives.

To establish this, I may be allowed to cite a few more examples.

The name dingir Innanna cannot be a proper name, for we find the *double* postposition after it. If it were a proper name, only *one* postposition would be expected.

"Eannatum....mu-shag-sa-a dingir Innanna-ka-ge."[3]
Eannatum....dam ki-ag dingir Innanna-ka-ge.[4]"

Hence we cannot translate the inscription of Lugaltarsi otherwise than has been done in E. B. H. p. 125_3, viz.: For the king of the lands (= Bêl) and for Innanna, the mistress of the divine Innanna, etc.

Among other names for "gods" which are used with a double postposition may be mentioned: dingir Nin-char-sag,[5] dingir Dumu-zi-zu-ab,[6] dingir Pa-sag,[7] gal + (ga)lu + dingir Erim,[8] and even dingir En-ki,[9] etc., etc.

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[1] See my *Early Babylonian History* (afterwards to be referred to as E. B. H.), p. 83 ff.

[2] For other examples see *ibid.*, col. VII, 9; V, 1; VI, 16; VII, 16 Cône of Entemena = E. B. H. p. 97 ff., col. V, 5 *et passim.*

[3] E. B. H. p. 84: Eannatum....who was called by the heart of the goddess of Innanna.

[4] Déc 3 B^1, col. II, 9: "Eannatum....the beloved husband of the goddess of Innanna. Thus it has to be translated! In this passage it is preceded by: Eannatum ....ku-li ki-ag dingir Gal + galu-Erim,—both sentences have to be separated on account of the parallelism. If we do not, then Lugal-Erim would become the dam-ki-ag of Innanna. That kings often *do* call themselves a "dam" or husband of a certain goddess is evident from E. B. H. pp. 230, 231, and notes.

[5] Galet A = E. B. H. p. 84, col. II. 3; comp. Déc. XLIV., col. IV. 10.

[6] *L. c.*, col. II, 9. [7] *L. c.*, p. 85, l. 11. [8] *L. c.*, l. 13.

[9] *L. c.*, p. 84, l. 7. dingir En-ki becomes thus the divine EN of KI. According to this analogy we ought to expect also, *l. c.* Col. I. l. 6, for mu-pad-da dingir En-

Not only, however, before the names of cities may NIN stand for bêlu. There are quite a good many "names of gods" composed with NIN, which can signify male gods only. In the composition of these names the NIN seems to mean as much as "possessor of" = Arabic dhû, dhât. To this class belong, among others, the following: ^{dingir}Nin-à-gal,[1] ^{dingir}Nin-dar-a lugal-en,[2] ^{dingir}Nin-gish-zi-da,[3] ^{dingir}Nin-gir,[4] Nin-dub lugal-en,[5] ^{dingir}Nin-sar gir-lal ^{dingir}Nin-Gir-su.[6]

If in this way NIN *may stand* for bêlu as well as for bêltu, we have, in order to determine the gender of the gods, whose names are compounded with NIN, to pay great attention to the titles or other attributes which may or may not follow. They will show us in most cases whether the god in question is either a male or a female.

The titles or attributes stand almost always in apposition, i. e., they *follow*[7] the name of the god. In these appositions we have to distinguish between:

(1) LULAL or EN and NIN on the one hand and;

(2) LUGAL and NIN on the other.

With regard to (1) as well as (2) the following examples may suffice:

Ur-Gur[8] dedicates an inscription to ^{dingir}En-lil, lugal-kur-kur-ra lugal-a-ni, i. e., to Bêl, king of the lands, his king. "The king of

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lil-ge = ^{dingir}En-lil-ka-ge. En-lil, however, I have not yet found with a double postposition.

[1] K. B. III[1]. p. 20: "the possessor of great power," whom Jensen, *l. c.*, p. 21, note *, takes according to II. R. 58, 58, to be "Ea als Gott der Schmiedekunst." K. B. III[1]. p. 24. E. B. H. 182, 185.

[2] K. B. III[1]. pp. 24, 28, 46, and E. B. H. 182_1, *et passim.*

[3] K. B. III[1]. pp. 28, 46, "the possessor of the tree of life."

[4] "The possessor of the gir," see below.

[5] I. R. 5. XXIII. Gudea Cyl. A VI. 5, "the possessor of the tablet."

[6] E. B. H. pp. 52, 54 (corrected! see below, p. 590, 6).

[7] Exceptions where the attributes precede the names are rare, but they occur. Comp., e. g., en ^{dingir}Nin-Gir-su "the lord Nin-Gir-su in Gudea Cyl. A. and B. pass. "Am Shir-pur-la-^{ki} azag ^{dingir}Ga-tum-dug" "the mother of Shirpurla, the glorious Gatumdug," Gudea, Statue B. VIII, 56, K. B. III[1]. p. 46. dingir-ra-mu ^{dingir}Nin-gish-zi-da "my god N." *l. c.*, col. IX., 4, and probably a few more.

[8] E. B. H. p. 222. For other examples, see E. B. H. *passim* and K. B. III.[1] p. 74–78.

the lands" and Ur-Gur's "king" is Bêl by virtue of his being a god. The former is his *attribute*, the *latter* expresses his *relation* to Ur-Gur. Rim-Sin[1] dedicates an inscription to dingir Nin-shach en-gal-lal . . . . lugal-a-ni-ir. The "en-gal-lal" expresses that which Nin-shach is by virtue of his being a god, the lugal-a-ni-ir expresses the relation in which he stands to Rim-Sin.

From these two observations we may draw the following rule:

Every *male god* when brought into relation to men (kings, or others who dedicate) is ALWAYS a LUGAL or "king," but by virtue of his being a god, he may be either a "LUGAL or king" or an "EN or lord." Every goddess, however, is by virtue of her being a goddess[2] as well as when brought into relation to men *always* a NIN[3] or "mistress." No. (1) expresses the titles of gods *as* gods. No. (2) expresses the *relation* of gods *to men!*

If this observation be true we may lay down another rule: NIN when in *apposition* indicates ALWAYS a *female* god, or goddess.[4] Thus there ought to correspond, e. g., to a LUGAL-EN a NIN-EN. Indeed we find this to be true! The dingir Nin-dar-a[5] is called LUGAL-EN[6], while dingir Ninâ has the apposition NIN-EN[7] or NIN-EN-NA.[8]

We have seen above that even the name dingir EN-KI must be composed of two separate names on account of the double post-position which it may suffer behind it. The dingir EN-KI is as the EN indicates a *male god*, hence is followed also by LUGAL[9] in

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[1] I. R. 3 No. X = K. B. III[1]. p. 94, 3. For a similar case see IV. R. 35 No. 6 = K. B. III[1]. p. 96, 6.

[2] See below the attributes of the wife of En-lil.

[3] E. B. H. p. 125. 222 *et passim*.

[4] EXCEPT when NIN stands *before* the name of a CITY or place! See p. 578, 1. dingir Dumu-zi-zu-ab NIN Ki-nu-nir-ki, in this case NIN may be *doubtful!* Further attributes or the name itself of the god must explain the gender in this case!

[5] Also read dingir Nin-si-a.

[6] E. B. H. p. 193. K. B. III[1]. p. 24. Lugal-en probably = the "lord of the priests," i. e., "the highpriest."

[7] E. B. H. pp. 193, 224, note 4, Nin-en probably = "the mistress of the priests," i. e.. "the highpriestess."

[8] E. B. H. p. 87 note.

[9] See, e. g., lugal zu-ab, Déc. 4 B[2], col. IV, 3.

apposition. The counterpart of ^{dingir}EN-KI is ^{dingir}NIN-KI, which name is also to be found in the Earliest Babylonian Inscriptions.[1]

Here, then, we have *another* peculiarity. We do not find LUGAL + X for the male god, as we might expect, but ALWAYS EN. "EN" in such names as ^{dingir}EN-KI indicates the *masculine*, while "NIN" indicates the *feminine* gender. What may be the reason for THIS peculiarity? The answer is: male or masculine gods are LUGAL = king from the standpoint of men to whom kings, of course, also belong, but EN, when compared with their equals, their wives, i. e., "the husband-god" and the "wife-god," are on the same level considered by themselves, but when brought into relation with *men* the "husband-god" seems to enjoy a greater prerogative; nay, the kings considered themselves equal to a goddess, hence they sometimes called themselves the "dam" or husband of this or that goddess.[2]

To the same class with ^{dingir}EN-KI belong among others also ^{dingir}EN-LIL, ^{dingir}EN-ZU,[3] ^{dingir}EN-GUR,[4] ^{dingir}EN-Ba-u,[4] etc., etc. In all these names the "EN" corresponds to our "husband," or "Mr." If NIN were substituted for EN, we should have the "wife" or "Mrs."—hence the real proper name of ^{dingir}EN-KI would be ^{dingir}KI; the EN or NIN having been put before the KI in order to distinguish the "*husband*" from the "*wife*," or the "Mr." from the "Mrs."[5] In course of time these names came to be looked upon as *real* proper names, and only now and then does their grammatical construction betray to us the true fact, i. e., that

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[1] E. B. H. p. 81, note 1.

[2] See above, p. 580, 4. This fact also probably contributed somewhat to the "divine character" of the kings.

[3] See E. B. H. Index, gods, p. 443 sub E.

[4] So far not found in the oldest inscriptions. Thureau-Dangin in C. R. 1902, Janvier, p. 82, note 2, proposes to read the sign GUR = Engur, referring to C. T. XII. 38128, Rev. l. 18 compared with II. R. 58, 53*a*.

[5] Thus it happened that in course of time the deity was *differentiated*, i. e., the deity was originally a self-perpetuating being, a kind of androgyn, and later on was separated or thought to exist as "husband" and "wife." Comp. the ^{dingir}GUR, ^{dingir}EN-GUR, ^{dingir}NIN-GUR and also Gen. ii. 21, where Eve is said to have been made "from one of the ribs," i. e., better "sides" of Adam.

they are names composed out of EN resp. NIN + the *real name* of the god.

The last point which we have to discuss is the use of the name DINGIR or "god." The oldest Babylonian inscriptions are *always very careful* to put the ^{dingir}-sign before the name of a god.[1] The names for god Anu[2] and Gu-la[3] are probably the only ones which generally occur without the dingir-sign.[4]

The negligence in omitting the sign *dingir* before the names of gods begins at the time of the first dynasty of Babylon. Above we have seen that every city had its god. Not only the cities, however, but also the different kings and patesis (priest-kings) had their favored deities whom they termed *dingir*,—while the others were either LUGAL or NIN. The *god* of Urukagina was ^{dingir}Nin-shullil,[5] that of Eannatum,[6] and Entemena:[7]

^{dingir}Dun-gur[8] or also written ^{dingir}Dun-gur-an;[9]

^{dingir}Nin-à-gal[10] is the god of Ur-Ba-u;

^{dingir}Nin-gish-zi-da[11] that of Gudea;

^{dingir}Lugal-banda[12] that of Sin-gâshid, etc., etc.

If cities and kings and patesis had their special gods, it is more than probable that also the "lands" and "countries," the "families" and "tribes," in fact, every "person," had his own

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[1] Except when the name of a god occurs in a name of a city: e. g., EN-LIL-^{ki} = Nippur, for ^{dingir}EN-LIL-^{ki}. But see E. B. H., Index, Gods.

[2] In the Old Babylonian inscriptions the god Anu is mostly written AN-NA, but also AN-E (Gudea, Statue B, VIII. 45 = K. B. III[1]. p. 46), An-nu-um, ^{ilu}An-nu-um, and ^{dingir}AN occur, see E. B. H, Index, Gods, p. 442. Here also belongs, of course, his wife An-nat.

[3] See E. B. H. p. 443.

[4] ^{dingir}Ba-u, when in proper names and written "Ba-bi," has never the sign of dingir.

[5] E. B. H. p. 51.

[6] E. B. H. p. 92.

[7] E. B. H. p. 108. K. B. III[1]. p. 72.

[8] E. B. H. p. 92.

[9] E. B. H. pp. 115, 116, 118.

[10] Ur-Ba-u V. 4, 5 = K. B. III[1]. p. 24.

[11] E. B. H. pp. 196, 199, 207. K. B. III[1]. pp. 28, 46 (= Statue B, III. 4, 5. IX. 4). Cyl. A. XVIII. 15 *et passim*.

[12] K. B. III[1]. p. 84. Lugal-banda is the husband of Nin-sun, who again is the mother of Nin-gish-zi-da (Cyl. B. 23, 5", 6"), and this latter is said to be a dumu-ka An-na-kam (Cyl. B. l. c.). For dumu-ka = "descendant," see E. B. H. pp. 14, 15.

special god. The inscriptions so far accessible to scholars do not shed much light upon this question, yet there are at least one or two examples that countries had their special gods: ^{dingir}Mar-tu, "the god of the Westland," i. e., of the Ammorites.[1] In the old Babylonian inscriptions, Babylonia, when spoken of in its totality, i. e., when South and North Babylonia are meant, is called:

Ki-en-gi-ki-Urdu (BUR-BUR).

A ^{dingir}Urdu (BUR-BUR)-zi occurs in an inscription of Ninkagina[2] and in Cyl. B of Gudea.[3] The ZI in the name of this god is, no doubt, the same as that in the name ^{dingir}EN-LIL-ZI, which latter name is explained by nu-banda (?) ^{ilu}Bêl (EN-LIL),[4] i. e., "the servant of Bêl." The ^{dingir}Urdu-zi then is the "servant" of "god Urdu," and as ^{dingir}EN-LIL is the city-god of Nippur, so probably is ^{dingir}Urdu the country-god of Urdu (BUR-BUR), which latter again with "KI" or "place" sign before or after it, signifies the country "Akkad." In like manner, we might explain Ki-en-gi as the land (KI) of EN-GI—and EN-GI being = "husband" or "Mr." GI—we should have here another god of a country, viz., that of Shumer.[5]

The results of our investigation so far would be as follows:

NIN before or in composition with the names of cities and deified attributes may stand either for a male or female god,—the context or syllabaries or other texts must be taken in to decide the gender of each respective god.

LUGAL before or in composition with the names of cities or deified attributes stands always for a male divinity.

NIN in apposition or as attribute of a divinity always shows that that divinity is *feminine*; if it be masculine the word LUGAL or EN is used.

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[1] E. B. H. p. 411. Here belong, of course, the deified attributes ^{dingir}Lugal-kur-kur-ra, ^{dingir}Nin-char-sag, etc.

[2] E. B. H. p. 186. [3] Cyl. B. IX. 13. [4] II. R. 59 col. I. 20.

[5] If my explanation of Shumer = Gir-su (see E. B. H. p. 216 ff.) be correct, the ^{dingir}Nin-Gir-su, the surname, would stand for the god GI or better for ^{dingir}EN-GI. Such a ^{dingir}EN-GI seems to occur in IV. R. 35 No. 6 = K. B. III^{1}. p. 96. 6.

NIN and EN in proper names for gods correspond to our "Mr." and "Mrs." The real name of the god being always expressed by the sign that follows the Nin or EN respectively.

Bearing this in mind, we may now consider the names of the different gods themselves.

1. The god LIL.

Mr. LIL, according to our rules laid down above, would have to be called ^{dingir}EN-LIL and Mrs. LIL, ^{dingir}NIN-LIL—both occur in the oldest inscriptions.[1] ^{dingir}EN-LIL is called lugal-kur-kur.[2] This attribute has become in course of time even a proper name, to which the sign *dingir* was prefixed: ^{dingir}Lugal-kur-kur.[3] If EN-LIL was a lugal-kur-kur, then his wife must have been a nin-kur-kur; this would follow from the analogy of the case! So far I have not yet seen an inscription where NIN-LIL is called nin-kur-kur, but EN-LIL is called also lugal-an-ki,[4] and NIN-LIL nin-an-ki.[5] Not only NIN-LIL is the "mistress of heaven and earth" but also ^{dingir}Nin-char-sag.[6] This latter goddess is also called am dingir-ri-ne[7] and am tur-tur-ne,[8] while ^{dingir}En-lil has the title: ab-ba dingir-dingir-ru-ne,[9] and is the same as the ^{dingir}Lugal-dingir-e-ne.[10]

Am dingir-ri-ne is also the attribute of ^{dingir}Nin-tu.[11] ^{dingir}Sal (var. NIN)-in-si-na[12] is called am kalam-ma zi-gàl kalam gim-

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[1] For the different writings and for references see E. B. H. Index, gods, sub. E. and N., pp. 443 and 445.

[2] "King of the lands," E. B. H. pp. 131, 134, 151 *et passim*.

[3] E. B. H. p. 125, note 3; p. 132, l. 14.

[4] "King of heaven and earth," Stele of Vultures, London 23580, col. II. 10.

[5] "Mistress of heaven and earth," E. B. H. p. 125, note 1.

[6] E. B. H. p. 199 and note 5.

[7] "Mother of the gods," Ur-Ba-u III. 8 = K. B. III[1]. p. 22.

[8] "Mother of the children," E. B. H. p. 198 and note I. 3.

[9] E. B. H. p. 97, "father of the gods," cp. the a-bu ilâni banû in Shalm. II. Obelisk l. 4.

[10] IV. R. 35_1 = K. B. III[1]. p. 78, "the king of the gods."

[11] E. B. H. p. 199, and note 5.

[12] See also ^{dingir}Innanna ^{dingir}Nin-an (sic! not dingir)-si-an-na E. B. H. p. 273.

gim-me[1] and dumu-sag an-azag-ga.[2] This latter title she has in common with dingir Ba-u,[3] who again is called dumu AN-NA[4] or dumu-sag AN-NA[5], but also dingir Ga-tum-dug is called dumu an-azag-gi tu-da.[6] dingir Ba-u[7] as well as dingir Ga-tum-dug[8] are called am Shir-pur-la-ki, i. e., "mother of Lagash," the former is also known under the name Nin-an-da-gal-ki,[9] as such again she is identical with dingir Nin-char-sag![10] EN-LIL was called lugal-kur-kur, and the nin-kur-kur is dingir Innanna.[11] Especially interesting is the dingir Innanna nin-char-sag[12]—this latter attribute being made later on a proper name, thus becoming dingir Nin-char-sag! Other attributes of dingir Innanna are: nin mè[13] and nin azag-nun-na.[14]

Sometimes dingir Nin-lil,[15] or dingir Innanna,[16] or dingir Nin-char-sag[17] is coupled with dingir En-lil. From all this it follows that the above given goddesses were originally the same as "Mrs." Lil or NIN-

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[1] "Mother of the world (or people), who created the creatures of the world," E. B. H. p. 202, note I. 1.

[2] E. B. H. p. 202, note I. 1: "the firstborn of An-azag-ga, i. e., the glorious AN."

[3] E. E. H. p. 209: Gudea, Statue H. col. I. 6.

[4] E. B. H. *l. c.* col. I. 3. Gudea, Statue G. col. II. 5 = K. B. III[1]. p. 58, 'child of AN-NA."

[5] Gudea, St. B. VIII. 59 = K. B. III[1]. p. 46, Cyl. A. XX. 19.

[6] Gudea, Cyl. A. II. 27 = Thureau-Dangin, Le songe de Goudéa, p. 6, "child born of the glorious AN.

[7] E. B. H. p. 21. But see also Déc. p. XXXIII. and Revue archéol, 1886, pl. VII. No. 1.

[8] Gudea, Statue B. VIII. 56, 57 = K. B. III[1]. p. 46.

[9] "Mistress of the wide heaven and earth," E. B. H. 206, and note 12.

[10] See above, p. 586, 6.

[11] "Mistress of the lands," E. B. H. p. 199 = Gudea, Statue C. col. II. 2, and p. 201, col. IV. 10.

[12] P. S. B. A. XIII. 159 = K. B. III[1]. p. 98 (Rim-Sin): "Innanna the mistress of the mountain."

[13] "Mistress of battle," Gudea, St. B. VIII. 61.

[14] "The glorious exalted mistress," Ur-Ba-u IV. 8. Jensen, K. B. III[1]. p. 22.

[15] E. B. H. p. 125, note 1.

[16] E. B. H. p. 125, note 2: here after dingir Lugal-kur-kur, which is here, as was shown above, p. 586. 3, a name for dingir EN-LIL.

[17] Gudea, Statue B. VIII. 47 = K. B. III[1]. p. 46.

LIL, who is expressly called the dam ^{dingir}En-lil.[1] They represent NIN-LIL in her different capacities and are "deified" attributes of the wife of LIL. Such a "deification" of attributes seems to have been almost endless and began at the very earliest times of Babylonian history.

Not only, however, the attributes contributed greatly to the multiplicity of a single god or goddess, but also the places where such a god or goddess might be worshipped. Thus we have a ^{dingir}Innanna-edin,[2] a ^{dingir}Innanna-Erin-^{ki} (= the goddess of Susa), and in later times the Ishtar of Arba-ilu, of Ninâ, and Kidmuri. There seem to have been even different EN-LILs, as is apparent from such expressions as ^{dingir}En-lil En-lil-^{ki}-a[3] "the Nippurian Enlil or Bêl" in contradistinction to *another* Bêl. ^{dingir}Ba-u, another name[4] for ^{dingir}Nin-lil, the wife of EN-LIL, is the dumu or sometimes also the dumu-sag of AN-NA, i. e., the "child" or "firstborn child" of AN-NA.[5]

What was the name of the father of EN-LIL? The old Babylonian inscriptions do not give an answer to this question, but from Assyrian inscriptions we know that Bêl (the Semitic Babylonian for EN-LIL) was called the mâr rêshtû shamê, i. e., "the firstborn child of heaven." The Assyrian shamê translates the Sumerian AN or AN-NA, hence it follows also EN-LIL was the firstborn of AN. This is important: ^{dingir}Ba-u as well as ^{dingir}En-lil are a FIRSTBORN; both are *brother* and *sister* but at the same time *husband* and *wife!*

(2) The children of EN-LIL.

(*a*) The god ZU.

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[1] "The wife of Enlil," E. B. H. p. 125_1.

[2] See E. B. H. Index, gods.

[3] E. B. H. p. 272 *et passim.*

[4] On account of the writing "Ba-bi," see the proper name Ur-Ba-bi and the E-Ba-bi in E. B. H. pp. 237, 326, and 365. I consider "Ba-u" to be a *Semitic* name. In later inscriptions occurs also the writing ^{dingir}Ba-bur. Ba-bi = genitive, and Ba-bur = dative (sic !) is in *Sumerian* impossible. Ba-bur is formed in Semitic *and* Sumerian fashion, as the r (= ra or ru) shows. In good Sumerian the postposition "ra" is shortened to r only after i as in ni, cp: dingir-ra-ni-ir, lugal-a-ni-ir ! This ^{dingir}Ba-u has of course nothing to do with the בהו in Gen. i. 2.

[5] See above, p. 587, 4. 5.

Mr. ZU is EN-ZU[1] and Mrs. ZU is NIN-ZU. The latter is known to me only from the proper name Ur-^{dingir}Nin-zu, "the servant of NIN-ZU."[2] Another, *later*, name[3] for EN-ZU was ^{dingir}Uru,[4] or mostly written ^{dingir}Uru-ki.[4]

This ^{dingir}Uru-ki is the dumu-sag ^{dingir}En-lil-lal.[5] Under the name ^{dingir}En-zu he is known also as the amar-banda ^{dingir}En-lil[6] and as ^{dingir}Uru-ki as the amar-banda An-na.[7] The wife of ^{dingir}Uru-ki is also called ^{dingir}Nin-gal.[8] Uru-ki or En-zu had several children:

α. ^{dingir}UD,[9] who is called "sib tu-da ^{dingir}Uru-ki."[10] The wife ^{dingir}A-A of ^{dingir}UD is so far not found in Old Babylonian texts.

β. ^{dingir}Innanna nin char-sag . . . TUR-SAL ^{dingir}EN-ZU-NA.[11]

With ^{dingir}UD probably is closely connected the ^{dingir}AMAR-UD, i. e., "the ox of UD,"[12] or "the child of UD."[13] This god does not[14] occur in the oldest inscription. He is known to us

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[1] For the inscriptions in which he occurs see E. B. H., Index, gods, p. 443 sub E.

[2] E. B. H. 412, $_1$. To read Nin-a-zu for Nin-zu is not necessary, for we know from later inscriptions that EN-ZU had a *wife*, and if he had, her real or original name *must* have been ^{dingir}Nin-zu.

[3] Which was originally an attribute of EN-ZU.

[4] See E. B. H., Index, gods, p. 445 sub U. The ki at the end probably is only the prolongation syllable. Comp. also Uru-nung-^{ki}-ma, not Uru-ki-nung-^{ki}ma.

[5] "The firstborn of Enlil." 1 R. 1 No. I. 4 (K. B. III^1. p. 76 No. 3), 1 R. 1 No. I. 5 (K. B. III^1. p. 78. $_4$). 1 R. 5 No. XX (K. B. III^1. p. 92, l. 21).

[6] Déc. 4 B^2. V. 1, "the strong ox = puru iqdu, rêmu iqdu of En-lil.

[7] 1 R. 1 No. I. 4 = K. B. III^1. p. 76, $_3$.

[8] "The great mistress," 1 R. 2, No. VI, 1 (K. B. III^1. p. 86, $_1$); 1 R 2, No. IV (K. B. III^1. p. 90, *d*).

[9] Generally read ^{dingir}Utu.

[10] "The shepherd, born by Uru-ki." 1 R. 2, No. VI. 1 (K. B. III^1. p. 86, $_1$.)

[11] "Innanna; the mistress of the mountain . . . . the daughter of ^{dingir}En-zu, P. S. B. A. XIII. 159 (K. B. III^1. 98). Comp. also Ishtar's descent, IV. R. 31, $_2$ (K. B. VI. 81): ^{ilu}Ishtar TUR-SAL ^{ilu}Sin. For the writing EN-ZU-NA for EN-ZU, see also E. B. H. p. 317, $_1$: ^{dingir}Ur-^{dingir}En-zu-na.

[12] Comp. the "amar banda" above, note 6.

[13] Comp. the proper name ^{dingir}AMAR ^{dingir}EN-ZU = Bur-Sin II., King of Ur, E. B. H. p. 266, note 2. According to the analogy of this name AMAR-UD might also be translated by "an ox is UD or Shamash."

[14] The cities Tu-tu-^{ki} (E. B.H. p. 174), Su-kur-ru-^{ki} (E. B. H. p. 302. xi) do not prove anything. OBI No. 87. I. 30 is ^{dingir}UMU and not ^{dingir}SHID (E. B. H. p.

only since the time of the first dynasty of Babylon, about 2400 B. C.

In this line somewhere belongs also Nin-gish-zi-da, Lugal-banda, and Nin-sun, see above p. 584, 12.

b. Another child of dingir En-lil is dingir Nin-Gir-su,[1] the city-god of Girsu. How this god was originally called, or what his real name was, we do not know as yet.[2] He is a male divinity.[3] The wife of dingir Nin-Gir-su was dingir Ba-u.[4] A sister of dingir Nin-Gir-su is dingir Ninâ.[5] The dumu-ush–7 dingir Ba-u-me banda en dingir Nin-Gir-su-ka-me[6] are hardly the sons of En-lil and Ba-u but of Nin-Gir-su

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133). Su-kur-ru-ki should be read according to Br. Mus. 82–8–16, $_1$, l. 45: Shu-ru-up-pak. Tu-tu-ki had probably also another pronunciation. Strange, very strange, is that Bur-Sin II., whose name is written dingir AMAR dingir EN-ZU, should be worshipped after his death as the MUL-AMAR-UD (E. B. H. p. 316). He, being while alive a "child of Sin," becomes sometime after his death a "child of Shamash"!

[1] Cyl. A of Gudea, col. VII. 5: dingir Nin-gir-su dumu dingir En-lil-lal-ka. *Ibid.*, VIII. 21: dumu dingir En-lil-lal en dingir Nin-Gir-su, cp. also *ibid.* IX. 3.

[2] See, however, above, p. 585. [3] See above, p. 579.

[4] dingir Nin-Gir-su-ge dingir Ba-u dumu An-na dam ki-ag-ga-ni. Gudea, Statue G, col. II. 3 ff. (K. B. III^1. p. 58). This dingir Ba-u is of course the same as the dingir Ba-u the wife of dingir En-lil.

[5] See below sub "god KI."

[6] "The 7 sons of Ba-u the banda of lord Nin-Gir-su." Gudea, Cyl. B. XI. 11, 12. The sign ush after dumu is not quite clear. The 7 is plainly written. According to my transcription which I made from Price's text, there seem to be mentioned only 6 sons. Where is the seventh? The six mentioned are the following (l. l. 4–10):

l. 4. dingir Za-za-ru.
5. dingir Im-pa-ud-du.
6. úr (= ishdu)-kalam-ta-ud-du-a.
7. dingir Ghe(GAN)-gir-nun-na.
8. dingir Ghe(GAN)-shag-ga.
9. dingir Ka-úr(= ishdu)-mu.
10. dingir Za-ar-mu.

Uru-ka-gi-na in his Barrel-Cylinder, E. B. H. p. 53, mentions also the following gods: II. 10. dingir Za-za-ru, 11. dingir Im-pa-ud-du, 12. dingir Gim-nun-ta-ud-du-a. 14. dingir Nin-sar gir-lal dingir Nin-Gir-su (so read also E. B. H, p. 52, l. 23, where Nin-sar is mentioned too, and comp. for this reading Déc. p. XLIX, copie de F. Thureau-Dangin). There can hardly be any doubt that dingir Gim-nun-ta-ud-du-a is = úr-kalam-ta-ud-du-a, hence we ought to read above l. 6 = dingir Ur-kalam-ta-ud-du-a. For the formation of the name comp. dingir E-SHIT-LAM-ta-ud-du-a = Nergal.

and Ba-u. A child of dingir Nin-Gir-su was also called dingir Dun-shag-ga.[1] He must be a male god, because Gudea dedicates the inscription to him as his "KING."[2] He probably is the same as the dingir Ghe(GAN)-shag-ga.[3] Another child of Nin-Gir-su was dingir Gàl-alim dumu ki-ag-ga-ni en dingir Nin-Gir-su.[4]

3. The god AN.

According to our principle laid down above, "Mr." AN[5] would be called EN-AN and Mrs. AN NIN-AN. The EN-AN occurs so far only in proper names, as e. g., EN-AN-NA-tum.[6] NIN-AN is not found at all. That there indeed existed a "Mr." and a "Mrs." AN is evident from the Semitic Inscription of An-nu-ba-ni-ni, where they are called An-nu-um and An-nat respectively.[7] At the time of the fourth dynasty of Ur the eleventh month was sacred to him, which month was therefore called "the month of the festival of An-na."[8] He was the father of EN-LIL.[9] But who was the father of AN? Before we answer this question, we shall have to consider the god KI.

4. The god KI.

Mr. KI again is EN-KI and Mrs. KI NIN-KI. Both names occur already in the oldest inscriptions.[10] Another name of Mrs. KI was dingir Dam-gal-nun-na,[11] i. e., "the great wife of Nun." From

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[1] E. B. H. p. 195, 196: dingir Dun-shag-ga dumu ki-ag dingir Nin-Gir-su-ka lugal-a-ni Gudea.

[2] See above, p. 585.

[3] See preceding page, note 6.

[4] Gudea Cyl. B. VI. 22: "Gàl-alim his beloved child of Nin-Gir-su." See also Statue B. II. 18, 19 (K. B. III[1]. p. 28), and E. B. H. pp. 49, 51. He is mentioned by Uru-ka-gi-na in the same inscriptions in which the other sons of Nin-Gir-su occur!

[5] For the different writings see above, p. 584, 2.

[6] See E. B. H., Index, proper names, p. 436 sub E.

[7] E. B. H. p. 177.

[8] E. B. H. pp. 296, 299, 302: Itu Ezen An-na.

[9] See above, p. 588.

[10] For EN-KI see E. B. H. Index, gods, p. 443 sub. E., and for NIN-KI E. B. H. p. 81, note 1. The later writing dingir EN-KI-ga with an unknown pronunciation (Jensen, K. B. III[1]. p. 21, note †) I have not yet found in the oldest texts. Comp. here, however, the name: NUN-ki = Urudug-ki or Eridug-ki = Eridu.

[11] E. B. H. p 224. In the later Assyrian texts dingir Dam-gal-nun-na became Damkina. II. R. 55, 53. 54d (comp. l. 16): (Ea) Dam-ki-na ashshati-shu.

this it follows, that EN-KI had also the name NUN, or else NIN-KI could not have been called "the great wife of NUN." EN-KI is called lugal zu-ab.[1] This would presuppose a title "nin zû-ab" for NIN-KI; I have, however, not yet found this latter title for Mrs. KI. And because EN-KI is the lugal zu-ab it is probable that the ^{dingir}Dumu-zi-zu-ab,[2] also shortened to ^{dingir}Dumu-zi,[2] was a son of EN-KI. Of the ^{dingir}Dumu-zi the later ^{ilu}Tammuz is no doubt a simple contraction.[3] To ^{dingir}Dumu-zi was dedicated at the time of Sargon I. and later on also at the time of the fourth dynasty of Ur, the *sixth*[4] month, which was called "the festival of ^{dingir}Dumu-zi."[5] A daughter of EN-KI (hence also a brother of ^{dingir}Dumu-zi-zu-ab) was ^{dingir}Ninâ.[6] In the old Babylonian texts she is called "a child of NUN-^{ki},"[7] i. e., Eridu. Gudea calls her:

nin-en nin-me ^{dingir}KAL ^{dingir}KAL-LA
nin ^{dingir}En-lil-gim nam-tar-tar-ri.[8]

The epithet nin-en of Ninâ is found also in other inscriptions[9] —but always after Ninâ! To the nin-en must correspond, as we have seen, a lugal-en, and this is the epithet of ^{dingir}Nin-dar-a,[1]

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[1] "The king of the zu-ab, i. e., the apsû or abyss." Déc. 4 B^{2}. col. IV. 3.

[2] For references see E. B. H. Index, gods, p. 442, sub. D.

[3] See E. B. H. p. 298.

[4] Thus we ought to number and not as it was done in E. B. H. pp. 287 and 306 (List of months, the first two columns). The itu Ezen She-il-la, instead of being the first, ought to be the *last* (12th or 13th) month! See Thureau-Dangin's review of my E. B. H. in Z. A. XV. p. 409. The festival of Tammuz was celebrated in Phœnicia and Palestine, likewise originally in the 6th month, see Ezekiel viii. 1. (Masoretic Text). In later times, beginning with the first dynasty of Babylon about 2400 B. C., the month of sowing SHU-KUL-NA became the month Du-'-u-zu, i. e., Tammuz or the 4th month. E. B. H. p. 306 (list of months).

[5] Itu Ezen ^{dingir}Dumu-zi, E. B. H. p. 288, 306 (list).

[6] IV. R. 1, col. II. 38.

[7] ^{dingir}Ninâ dumu NUN-^{ki}, Gudea, Cyl. A. XX. 16. Comp. *ibid.* col. II. 15, NUN-^{ki} is the city of NUN or EN-KI!

[8] Mistress of the priests, mistress of the decrees (? ME or better divinations then = shib for me!) of the ^{dingir}KAL, mistress who like En-lil decrees the fates. Gudea, Cyl. A. IV. 8, 9. Comp. also Thureau-Dangin, Songe de Goudéa, C. R. 1901, p. 119, and the other epithet: en-me-li (= enshi), Cyl. A. II. 1, 16, III. 26; IV. 12 *et passim.*

[9] E. B. H. pp. 193, 224 note 4, 87 note.

[10] E. B. H. p. 193. Ur-Ba-u, col. V. 2 (K. B. III^{1}. p. 24).

who becomes thus the husband of ^{dingir}Ninâ. Of him we know in other respects nothing.

A *second* name of the husband of Ninâ was ^{dingir}Nin-dub, "the lord of the tablet (writing)," who together with Nin-Gir-su and Nidaba appeared unto Gudea in his dream, and who presented unto Gudea the "plan of the temple E-ninnû."[1] In another place[2] he is called "lugal-en" and has therefore exactly the same title as ^{dingir}Nin-dar-a, and is thus identical with the latter.

A *third* name of Nin-dar-a was ^{dingir}Lugal-Erim-^{ki}.[3] Ur-Ba-u calls himself the nitagh ki-ag, "the beloved servant" of this god.[4] My reason for identifying ^{dingir}Lugal-Erim-^{ki} with ^{dingir}Nin-dar-a = ^{dingir}Nin-dub = ^{dingir}Ud-mà-Ninâ-^{ki}-shurit-ta (see below) is this: Lagash or Shirpurla consisted of four suburbs, each suburb being called after the name of a god, or better, being dedicated to a god. These suburbs were:

1. Gir-su-^{ki}, with ^{dingir}Nin-Gir-su as its god.
2. Uru-azag-ga with the wife of Nin-Gir-su: ^{dingir}Ba-u as its patroness.
3. Ninâ-^{ki} with ^{dingir}Ninâ, and
4. Erim-^{ki} with ^{dingir}Lugal-Erim-^{ki}.

It seems probable that Ninâ-^{ki} (^{dingir}Ninâ) stands in the same relation to Erim-^{ki} (^{dingir}Lugal-Erim-^{ki}) as does Uru-azag-ga (^{dingir}Ba-u) to Gir-su-^{ki} (^{dingir}Nin-Gir-su). In this case, we would have here "two couples," each couple consisting of *husband* and *wife*. These couples are also "brothers and sisters"—for ^{dingir}Ninâ expressly calls ^{dingir}Nin-Gir-su *my brother*.[5] If this observation be true, then ^{dingir}Lugal-Erim-^{ki} would be

(1) the husband of Ninâ and

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[1] See Gudea, Cylinder A. col. VI. 5 and V. 2 (where he is not mentioned with name) and Thureau-Dangin, Songe de Goudéa, p. 121.

[2] I. R. 5, XXIII. = Winckler, *Altbabylonische Keilschrifttexte*, p. 4, No, 11a,

[3] E. B. H. p. 113. Jensen, K. B. III[1]. p. 20 (Ur-Ba-u col. II. l. 2).

[4] Jensen, *l. c.*

[5] Gudea, Cyl. A. V. 17 and 11. See below, p. 594, 5.

(2) the brother of Nin-Gir-su, i. e., he would belong to the descendants of ^{god}KI and thus be a son of ^{dingir}EN-KI.[1]

Other attributes of Ninâ are: en-me-li-azag[2] or en-me-li dingir-ri-ne;[3] nin-in-dub-ba.[4] ^{dingir}Ninâ calls ^{dingir}Nin-Gir-su "my brother,"[5] and ^{dingir}Nidaba "my sister."[6] ^{dingir}Ninâ is also called the NIN of ^{dingir}Ud-mà-Ninâ-^{ki}-shurit-ta.[7] It may not be impossible that this ^{dingir}Ud-mà-Ninâ-^{ki}-shurit-ta be a *fourth* name of her husband[8] ^{dingir}Nin-dar-a.

The firstborn of Ninâ was ^{dingir}Nin-Mar-^{ki}.[9]

To KI's line belongs, no doubt also ^{dingir}Gal-dim-zu-ab.[10]

From Old Babylonian inscriptions we cannot as yet make out the father or the mother of EN-KI himself, but a later text tells us that "^{dingir}GUR was the mother of god Ea."[11] Who or what is this ^{dingir}GUR?

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[1] It should be observed here, that the husband of a wife is at the same time *always* her brother! Comp. ^{dingir}EN-LIL and ^{dingir}Ba-u. See also Winckler, M. V. A. G. 1901, 4, p. 14 ff.

[2] Gudea, Cyl. A. II. 1 III. 16. For en-me-li to be pronounced enshi, see Br. 2918. Br. Mus. 82–8–16, 1 (= A. W. p. 54 f. = Hom. S. L. p. 97) l. 21. Thureau-Dangin translates it by "divineresse," Songe de Goudéa, p. 116.

[3] Gudea, Cyl. A. II. 16, IV. 12.

[4] "Mistress of tablet writing," Gudea, Statue B. VIII. 53. E. B. H. 193.

[5] Shesh-mu ^{dingir}Nin-Gir-su, Gudea, Cyl. A. V. 17, comp. with l. 11. See also Gudea, Statue D. IV. 2–3 (K. B. III^{1}. p. 52), where Ninâ and Nin-Gir-su are coupled together.

[6] Gudea, Cyl. A. V. 25: nin (notice the sign for nin)-mu ^{dingir}Nidaba.

[7] Gudea, Cyl. A. II. 1, 17, III. 27, IV. 5 (E Kisal ^{dingir}Ud-mà-Ninâ-^{ki}-shurit-ta). Nin here = sister? (notice the sign!). E. B. H. p. 193 (where instead of tag = shurit must be read on account of the prolongation syllable. For TAG = shurit see S^{c} 292).

[8] In this case NIN = "Mrs." or "wife of"; see above, p. 583. The temple of Ninâ was called E-Ud-mà-Ninâ-^{ki}-shurit and was situated in Ninâ-^{ki}, a suburb of Shirpurla-Lagash, E. B. H. p. 193.

[9] Ur-Ba-u V. 10 (K. B. III^{1}. p. 24): ^{dingir}Nin-Mar-^{ki} sal-shag-ga dumu-sag ^{dingir}Ninâ, i. e., Nin-Mar-^{ki} (the mistress of Mar, a city), the gracious lady, the firstborn of Ninâ. See also Gudea, Statue B. IX. 1 (K. B. III^{1}. p 46).

[10] E. B. H. p. 106.

[11] IV. R. 1, col. II. 36. The god Ea is "EN-KI." The sign GUR is = NI-GIN + inserted GHAL, the same as in Ur-Gur, king of Ur. For the reading EN-GUR instead of GUR see above, p. 583, note 4

Hommel[1] identified dingir GUR with dingir Ba-u. He was able to adduce seven "reasons" for his supposition. The very fact that he brought in just *seven* "reasons" was at once a bad omen. He introduces his seven reasons thus (p. 220):

"Da Bel, wie der Eigenname [2]E-KUR-dumu[2]-nunna (d. i., Igur Sohn Nunna's) beweist, als Sohn des Himmelsoceans von den Babyloniern aufgefasst wurde (vgl. auch noch Ursp., S. 37, Z. 6 v. u. Bel mâr rishtû shamí), so ist es nach der stereotypen Folge Anu, Bel, Ea, *mehr als wahrscheinlich, dass sie auch den Ea als Sohn Bel's betrachteten*[3] und dass in der Reihe Anum (Nun, anna), Bel (Gunlilla), Ea (Gun-kia oder Dugga), Merodach, die älteste babylonische Göttergenealogie vorliegt."

His argument about the sonship of Ea, then, is this: "On account of the stereotyped sequence Anu, Bel, Ea, it is *more than probable* that Ea was the son of Bel!" Upon this pillar of truth, this unquestionable fact of proof, his whole argument is built up. But let us go on. He says:

"Anum hat keine Gemahlin....das Fem. Anatu der lexicalischen Listen (ist) erst eine spätere Abstraction, welche in den alten bilinguen Texten wie in den Inschriften von Tello noch nirgends vorkommt."

This, I suppose, he probably will no longer maintain now, because the "An-nat" of Annu-bânini will be known to him. Annu-bânini lived even before Sargon I., i. e., before 3800 B. C.,—hence "An-nat" or the wife of Anu was known as early as that. He then speaks of the wives of Enlil and enumerates the Nin-lilla and the Nin-ghar-sagga and says:

"Ein anderer (viz., name of the wives of Enlil) war [4]dingir GUR,[4] eine ausgesprochene Himmelsoceansgöttin, welche in den bilinguen Texten als "Mutter des Gottes Ea" (*also demnach als Gemahlin des Vaters des Ea, eben des Bel*)[5] bezeichnet wird (4 R. i. 36 b)."

Because Ea was *declared on account of the stereotyped sequence*: Anu Bel Ea, to be *the son of Bel*, and because dingir GUR is the

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[1] "Die Identität der ältesten babylonischen und ägyptischen Göttergenealogie und der babylonische Ursprung der ägyptischen Kultur, in *Transactions of the International Congress of Orientalists*." Von Prof. Dr. Fritz Hommel. London, 1893.

[2] Given in cuneiform signs.

[3] Italics are mine.

[4] Given in cuneiform signs.

[5] Italics are mine.

mother of Ea, hence he follows ^{dingir}GUR *must* be also the wife of Bel! This argument, then, is again built upon the *sequence* merely. He goes on:

"Als Göttin aber *scheint*[1] ^{dingir}GUR[1] nicht die Aussprache GUR gehabt zu haben, sondern Ba'u....das geht aus folgenden....Gründen hervor:

"1. Die Göttin Ba-u heisst in den Gudea-Inschriften stets 'Tochter des Himmels,' ist also eine Schwester, resp. (was in der babylonischen Mythologie oft dasselbe ist) Gemahlin des Gottes Bel, demnach identisch mit der Göttin Nin-lilla oder der [1] ^{dingir}GUR,[1] welche letztere ja Mutter des Gottes Ea heisst."

Ba-u is the wife of Bel, hence the same as Nin-lil or ^{dingir}GUR, who is the mother Ea. Hommel wishes to prove that Ba-u = ^{dingir}GUR, but takes it for granted that ^{dingir}GUR is = Nin-lil, without any arguments of his,—a fair exhibition of Hommel's argumentation! He continues:

"2. In einer Zauberformel (4 R. 29, No. 4) ist die [1] ^{dingir}GUR [1] die Helferin der Kranken, besonders solcher an Augenweh leidenden....in einem ähnlichen ....Text, K 2378 + 224, wird sie unmittelbar nach der Göttin Nin-agha-kuddu (der Schwester Ea's) erwähnt als 'Herrin der reinen Gewässer,' nin a-gub-ba íl-la. Auch die Ba-u wird (in H., K. T. 11. xxvi) gegen Kopf-, Herz-, und Augenweh zugleich mit Nin-agha-kuddu und Gula angerufen."

^{dingir}GUR and Ba-u are invoked in case of sickness; especially when the eyes are diseased, twice they are coupled together with Nin-agha-kuddu,—hence ^{dingir}GUR = Ba-u,—a strong argument, indeed! For the same reason Hommel might have argued that Gula, a later name for Ba-u, is = Nin-agha-kuddu = ^{dingir}GUR,—for he might have substituted for Ba-u the Gu-la! By such argumentations we can prove *nothing, absolutely nothing, and everything!*

"3. Die [1] ^{dingir}GUR [1] trägt den Beinamen 'mit reinen (azagga) Händen'; die speciell der Ba-u heilige Stadt ist URU[1]-azagga, d. i., 'reine Stadt' (wol gleich Nipur)."

Because the word "azagga, pure," occurs in connection with "hands" in case of ^{dingir}GUR and in connection with URU or "city" in case of Ba-u,—hence ^{dingir}GUR = Ba-u! Further comment is unnecessary. Uru-azagga is not Nippur, but a suburb of Shirpurla.

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[1] Given in cuneiform signs.

"4. Das Ideogramm GUR[1] wird von den babylonischen Gelehrten ausdrücklich als 'Himmel' (ziku = shamû) erklärt (2 R. 50, 27), und die Ba-u heisst stets (siehe schon oben unter No. 1) 'Tochter des Himmels.'"

The sign GUR (notice, not [dingir]GUR) is = heaven, Ba-u is = daughter of heaven, hence GUR = Ba-u or heaven = daughter of heaven! And I may add [dingir]GUR = [god] of heaven = heaven = daughter of heaven, one follows from the other! The heaven becomes his own daughter! Splendid argumentation!

"5. Wie es einen Gott [1 dingir]EN-GUR[1] (= Ea, dann als Sohn der [1 dingir]GUR,[1] urspr. aber wol = Bel) gibt (Jens. Kosmol., S. 245), so gab es auch einen Gott [1 dingir]EN[1]-Ba-u [here Hommel refers to a note: vgl. auch 3 R. 67, 57....[1 dingir]GUR[1]-ra, NIN-[1]GUR[1]-ra, woraus zugleich hervorgeht, dass man später allerdings [1 dingir]GUR[1] Gurra las, was aber natürlich für die alte Zeit nichts beweist] Urspr., S. 19, Anm. 1). Wie es einen altbabylonischen Königsnamen Ur-[1 dingir]GUR[1] gab,....so gab es auch.... einen Ur-[dingir1] Ba-u."

The nonsense that follows is too great to be reproduced here, and has, I suppose, been given up by Hommel himself. His argument is this: GUR = Ba-u (which he wants to prove, mark ye!), "Gleiches zu Gleichem zugesetzt giebt Gleiches, und Gleiches von Gleichem abgezogen giebt Gleiches." If we add to GUR and Ba-u a [dingir]EN we get the same, and if we abstract from [dingir]EN-GUR and [dingir]EN-Ba-u, a [dingir]EN we get again the same—but this presupposes that GUR is already = Ba-u, which Hommel wishes to prove by this No. 5!

"6. [1 dingir]GUR[1] ist bei den Aegyptern die Morgendämmerung (siehe unten) wie bei den Babyloniern die Bau-u (3 R. 55, 49b)."

Here Hommel takes something as *proven*, which he has not yet proved!

"7. Endlich wird die Göttin [1 dinger]GUR[1]....in späterer Zeit in ganz gleicher Weise zur Gemahlin Nirgal's (4 R. 3⅞, col. 3, 30; vgl. 2, 46, die Gula als Gemahlin Nindar's) wie andererseits . . . die Ba-u, zur Gemahlin des Ningirsu (= Nirgal) wird (Statue G. 2. 6), während doch sonst die Göttin [1 dingir]Ninâ[1] (Ghanna) die Schwester (Gudea, Cyl. A. 5, 17) und Gemahlin des Ningirsu-Nirgal ist."

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[1] Given in cuneiform signs.

Hommel presupposes or takes for granted without any further argument of his that Ningirsu is = Nirgal. He first must prove this, then we shall want to answer him. Jensen, e. g., takes Ningirsu to be = Ninib, see K. B. III[1]. p. 23, note *†. We do not know as yet who this Ningirsu is! But see below!

The best, however, follows:

"Aus all diesen Anführungen," says Hommel, "*geht hervor*,"[1] dass [2] dingir GUR [2] and [2] dingir Ba-u *reine Synonyma*[1] sind, *ganz dieselbe Göttin von Haus aus bezeichnen*,[1] und dass *höchst wahrscheinlich*[1] auch die gewöhnliche Aussprache von [2] dingir GUR [2] Ba'u war, während die andere Aussprache gur offenbar nur dem unpersonificirten mythologischen Begriff GUR[1] (ohne Gottheitsdeterminativ) eignete. Ich habe dies deshalb so ausführlich und eingehend hier BEWIESEN,[1] weil in einem viel citirten Buche die betreffende Identification eine 'auch jeglicher Begründung entbehrende' genannt worden ist (Jensen, *Kosmologie*, S. 245)."

And I have taken this trouble to present to the public the splendid PROOFS of Professor Hommel, to show what nonsense they are. I do not possess Jensen's *Kosmologie*, nor is it accessible to me, hence do not know what arguments Jensen adduces to disprove Hommel. But arguments are not necessary at all to disprove the *above*-given "reasons"; every man with a little common sense will see instantly that they are nonsensical. To quote Hommel[3] again:

"Wer so einen Unsinn denken, schreiben und schliesslich drucken lassen kann, der hat überhaupt den Anspruch ernst genommen zu werden verwirkt."

All seven "reasons" of Hommel are built upon the sequence of Anu, Bêl, Ea, which suffices to *prove* for him that *Ea was the son of Bêl*, and because Ea was also the son of [dingir] GUR he follows, that [dingir] GUR must have been the wife of Bêl, and thus the same as [dingir] Ba-u!

The only passage in the old Babylonian inscriptions, where the sequence Anu, Bêl, Ea may be found is that of Gudea, Statue B. Col. VIII. 45 ff.: An-e [dingir] En-lil-li, [dingir] Nin-char-sag [dingir] EN-KI. And here Ea or [dingir] EN-KI is divided from Bêl or [dingir] En-lil by the wife of the latter! In all the other oldest inscriptions the

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[1] Italics and capitals are mine. [2] Given in cuneiform signs.

[3] Hommel, *Die Südarabischen Alterthümer des Wiener Hofmuseums*, p. 12 = *Aufsätze und Abhandlungen*, II. p. 140.

sequence of the gods seems to be without any special order, as one can easily convince himself, by examining the inscriptions with regard to this point. Furthermore the celebrated trilingual list of gods,[1] written in EME-SAL, Sumerian, and Semitic Babylonian, does NOT give the names of the gods in the sequence An, Bêl, Ea—which it would have undoubtedly done, if Ea had been the son of Bel, as Hommel supposes—but in the order Anu,[2] Ea, Bel. The same arrangement, viz.: Anu, Ea, Bel is found again in IV. R. 1, 61c ff. Hence, the sequence Anu, Bel, Ea would not prove anything at all. And if it does not, then is Hommel's statement, to say the least, nonsense, that it is "nach der stereotypen Folge Anu, Bel, Ea, *mehr als wahrscheinlich*, dass sie (the Babylonians) auch den Ea als Sohn Bel's betrachteten und dass in der Reihe Anum, Bel, Ea, Merodach, die älteste babylonische Göttergenealogie vorliegt." And if the sequence Anu, Bel, Ea does not prove anything, then it also follows that ^{dingir}GUR is not proven to be the wife of Bel or = Ba-u! The other seven arguments or "reasons" (Gründe) of Hommel are so foolish as to require no further refutation.

But who then was ^{dingir}GUR? In order to answer this question it is necessary to inquire into the meaning of god AN and god KI!

The sign AN is translated in Semitic Babylonian generally by shamû, i. e., "heaven," and the sign KI generally by irtsitu, i. e., "earth." Both signs occur very often together in the attributes of En-lil (lugal-an-ki[3]) and Nin-char-sag (nin-an-ki[3]), where they no doubt stand for "heaven and earth." That the original meaning of AN was not so much "heaven" and that of KI not so much "earth" is evident from the following considerations:

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[1] II. R. 59 (see Hommel, S. L. p. 46).

[2] Anu is called in the EME-SAL column = dim-me-ir; in the Sumerian: AN; and in the Semitic: i[-lum], i. e., the god κατ' ἐξοχήν. From this it would follow that the writing AN-E might also be read dingir-e, and that of AN-tum = il-tum, and lastly that of NI-NI-tum = ì-lì-tum, but in every case it would signify either the "god" or the "goddess" κατ' ἐξοχήν, i. e., Anu and his wife Annat.

[3] See above, p. 586, 4. 5. 6.

(1) "Heaven" in Sumerian means GISH and in EME-SAL: mu.[1]

(2) In the expression AN-ta = elish and KI-ta = shaplish, the AN stands simply for "that which is above" and the KI for "that which is below." Thus it happened that Jensen explained the name dingir EN-KI by "Herr, dessen was unten ist" = Ea.[2] If this explanation be correct, it would follow from the analogy of the case that the name AN or EN-AN[3] would have to be translated by "he who is above" or by "lord of that which is above."

This idea of "being above" and "being below" is no doubt the original one, and because "that which is above" was considered to be the heaven thus it came in course of time that AN stood for heaven, and KI "being that which is below" came to mean "earth."

3. En-lil, we have seen, was in later inscriptions also called E-KUR-dumu-nunna, i. e., E-KUR,[4] the son of *Nunna*. If this be true, then AN, the father of Bêl (see above: Bêl mâr rêshtû shamê) must also *have been*, or been called, a NUN!

4. But dingir EN-KI or Mr. KI was *also* called NUN as is apparent from the name of his wife dingir Dam-gal-nun-na, "the great wife of NUN." What this NUN means we know; it is the zu-ab or apsû, the ocean.

Thus we see instantly that AN was "the upper ocean" and KI the "lower ocean," or "*the heavenly ocean*" and "*the terrestrial ocean*," or as the Bible calls it, "the waters above the firmament" and "the waters below the firmament." This specific meaning of god AN and god KI has been recognised already by other scholars, even by Hommel, although I do not know what arguments he brought in.

Having thus established the *original* meaning of the words AN and KI respectively, we may turn to the relationship of AN and

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[1] Trilingual list of gods, II. R. 59, col. II. l. 47.

[2] K. B. III[1]. p. 21, note †.

[3] Comp. the proper name EN-AN-NA-tum and see above, p. 591, 6.

[4] E-KUR is originally the name of the *temple* of En-lil at Nippur.

KI, i. e., inquire whether god KI was the son of En-lil and thus the grandson of god AN, or whether he was something else.

In Assyrian we have a word achu which means "brother" and also "side." If this very same word is written achû (contracted out of achâiu) it means "enemy." Both words no doubt go back to the same root. But how then could the word achu possibly get the meaning "enemy" and be written achû? My explanation is this:

Achû, or achâiu, literally means: "he who or that which belongs to the brother," comp. Nippurû out of Nippurâiu, "he who belongs to Nippur," i. e., "a Nippurian." But "a brother" is in *every case* "the other," i. e., the "one who is not the *ego*," "who is in opposition to the ego," "who is opposed to the ego," and the one that is opposed to my ego is "my brother" and "my enemy!" If a person or a god is called "AN," then he who is his achu *had* to be called "KI" and as such he is "*in opposition to*" (an achû!) to the AN. If AN means the "*heavenly* ocean" and KI the "terrestrial ocean," we have here an achu in so far as they are both an ocean, hence also of the same *stock* or *parents*, but also an achû in so far as the KI is opposed to the AN, "the *terrestrial* ocean" to "the *heavenly* ocean." Comp. here also AN-SAR and KI-SAR; as SAR they are achu, as AN and KI they are achû![1]

And now, if dingir GUR is called the mother of god Ea or En-ki, it follows, because EN-KI is the achu and achû of god AN, that dingir GUR *must* be the mother of god AN too. AN and KI being the "heavenly and the terrestrial ocean," dingir GUR can only be the "primeval ocean." And it is more than mere accident that we should have handed down to us the following three writings of this

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[1] See also Winckler who has partly anticipated me here,—although his investigations are in quite another field,—who says in M. V. A. G. 1901, 4, part 1, p. 15, note 1, which has just come to hand: "Mythologisch—und damit im Zusammenhang der ganzen Weltauffassung—erscheint das Brudermotiv—wie alle—also in den zwei Gegensätzen, denn jedes Ding schlägt schliesslich in sein Gegentheil um, wie es der *Kreislauf* der Natur vorschreibt und bedingt. Wir haben die unzertrennlichen und doch getrennten Brüder: Dioskuren, Mond und Sonne = Nacht und Tag = Licht und Finsterniss = Winter und Sommer, die beiden Sonnen—und Naturhälften. Diese sind die *feindlichen* Brüder, deren einer den anderen tötet: Eteokles und Polyneikes, Baldr-Hödur (dessen Blindheit *Mond*motiv ist.)

deity: dingir GUR, dingir EN-GUR, dingir NIN-GUR. The last two stand for Mr. and Mrs. GUR, i. e., for apsû and tiâmat, for תהום and מים, or for חשך and רוח אלהים respectively. dingir GUR on the other hand signifies only god GUR, without laying special emphasis upon the male or female part, or *husband* and *wife*. dingir GUR thus becomes "the *primeval ocean*, κατ' ἐξοχήμ," and is as such *older* than NIN-GUR or EN-GUR. This also proves that we had originally only a god KI,[1]—and because the heavenly is only a reflex of the earthly, this god KI became a wife: a NIN-KI, "Mrs. KI"; and in order to distinguish the wife from the husband, or better, in order to avoid *misunderstanding*, the husband was called EN-KI, Mr. KI; for dingir KI alone, if used also of Mr. KI, would leave it doubtful whether god KI as a *whole*—male and female—were meant, or whether it stood for EN-KI only.

Furthermore, if dingir GUR (notice not dingir NIN-GUR, as we might expect) is called the *mother* of EN-KI, we may see in this a striking parallel to the Babylonian creation story as well as to the Biblical,—according to both the heavenly and terrestrial ocean take their origin from the tiâmat or tehom, i. e., the *descent was reckoned through the mother*.[2]

Tehom and tiâmat even in later times are used for "*ocean*" without any special reference to a mythological being as consisting of two genders: the male and female gender; so GUR may have been primarily the *ocean* and only in later times acquired this mythological conception of being male and female, thus able to generate and perpetuate itself. However this may have been, all suggestions that might be made here are at the very best only guesses. May it suffice therefore to have shown that dingir GUR was the primeval ocean who *brought forth* by process of *generation* —notice *generation*—two sons: AN and KI, who later on were together with GUR thought to be male and female, and thus able to perpetuate their own lines respectively. Having made this probable, we can now explain the succession: Anu, Bêl, Ea as well as Anu, Ea, Bêl. In this latter sequence the two brothers are men-

[1] See above pp. 580, 9; 582 ff.

[2] See above p, 576.

tioned first, then follows Bêl as the son of Anu. In the former sequence we have the father Anu together with his son Bêl, and Ea is the 'am, the *fathersbrother*, who plays such an important rôle in old Arabic inscriptions that even the word itself became a god, —the god 'Am.[1] Anu, Bêl, Ea, is thus proven to be what the Arabs call a racht, i. e., a community consisting of a head or "abu" = Anu, of an 'am = Ea, and of a nephew = Bel,[2] who form the first triad in the Babylonian pantheon as well as in the Assyrian, which triad, as we have seen, goes back to the Sumerian conception of the theogony and cosmogony.

As AN, originally the "heavenly ocean," became in later times the shamû or "heaven," thus KI, originally the "terrestrial ocean" became later on the irtsitu or "earth." We would expect that AN and KI became in consequence of this also the "god of heaven" and "the god of earth" respectively. But this is not the case. The "god of heaven and earth" was Bêl, for he is repeatedly called the "lugal-an-ki, "the king of heaven and earth." "Heaven and earth" were thus considered to be closely connected, yes, to be *one*, and what this *one* thing was called, we shall see, when we come to speak of ^{dingir}En-lil.

And if "heaven and earth" were considered to be one, it is, of course, natural, that we should not find a god in this Sumerian theogony who is called LUGAL-KI, shar irtsiti "the king of the earth." Hence, there does not seem to have existed at the time of the Sumerians a so-called "ba'al of the soil," who plays such an important rôle among the Semitic peoples.

The god KI had sons and daughters, all of whom we have met already above. It only remains here to explain their names. The sign by which Ninâ is expressed is composed of ESH or AB = "abode," with inserted CHA or "fish." Signs, when inserted into another sign, may be either an indicator of the pronunciation or an indicator of the sense. The latter I take to be the case here.

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[1] See Hommel, *Die südarabischen Alterthümer des Wiener Hofmuseums* München, 1899, p. 28 ff.

[2] See also Proksch, *Die Blutrache bei den alten Arabern*, p. 23, and Winckler, *M. V. A. G.*, 1901, 4, p. 16.

The sign "fish" may either stand for "fish" itself, or for "plenty." Ninâ then would be either a fishgoddess, or a goddess of plenty. The goddess Nidaba[1] "was the goddess of grain," as even the Ideogranun indicates it.[2] dingir Dumu-zi because = ilu Du-'-u-zu, and because to him was dedicated originally the sixth and in later times the fourth month called SHU-KUL-NA or "month of sowing" must have been "the god of verdure."[3]

According to the analogy we should expect for Ninâ's husband also some such signification as "verdure," or "fishes," or "plenty," or "grain;" this however cannot be made out as yet. It may not be impossible that the name dingir Nin-dub, because dub means "clay," then "clay tablet," may make that god to have been originally "the god of the clayground." However this may have been, the significations of the names of Ninâ, Dumu-zi, Nidaba, suffice to show us that we have to see in them the gods of either "what the earth produces" or "what the sea produces." If this be true then it follows that the dingir EN-KI, the "terrestrial ocean," was thought to contain the *earth also*, i. e., he was "the waters which contained the dry ground," or else he could not have produced sons or daughters who are the gods of "the *produce of the earth*"! As already said above, the Sumerians do not seem to have had "a god of the dry land or soil "κατ' ἐξοχήν."

What may possibly be the reason for this phenomenon? We know from the Gilgamesh epic—and our present investigation confirms it, as we shall see—that Eridu or NUN-ki, the city of Ea or EN-KI was one of the oldest cities of Babylonia, from which practically the whole of the specific Babylonian religion took its origin. Eridu, when the Gilgamesh epic was written, was a seaport town on the Persian Gulf, while to-day it is one hundred and thirty miles

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[1] For references see E. B. H. Index, gods, p. 444, sub. N.

[2] See Br. 7453, and comp. Trilingual list of gods, 2 R. 59, I. 24, where she is called the "wife of dingir Lugal-ki-sá(di)-a."

[3] In the sixth month the festival of "the dying of the verdure," while in the fourth month that of "the new life of the verdure" was celebrated. The former was the festival of the wailing for Tammuz, the latter that of his resurrection. See also Dr. Carus, *The Monist*, July, 1901, pp. 528 ff.

from the coast line. Here the Sumerians of old saw how new earth or dry land was added year by year to the already existing dry ground. Hence it was quite natural for them to think that "the earth was contained in the terrestrial ocean." But water is also necessary for vegetation! Hence also, vegetation, verdure of the dry ground, were made to be children of ^{dingir}EN-KI. In the ocean are also fishes, etc., and thus Ninâ the fishgoddess became of necessity his child. Thus we would expect "the ba'al of the soil" to be a son of EN-KI. It may very well be possible that future investigations will shed light upon this question. At the present it will be best not to put too great an emphasis upon this omission, for any of the gods not yet identified may become in future times "a god of the soil."[1]

The firstborn of EN-LIL or Bêl is the god ZU, i. e., ^{dingir}EN-ZU or also called ^{dingir}Uru-ki. This latter is translated into the Semitic-Babylonian by Nannar,[2] i. e., "the luminary." The "na-an-na-ri shame-e ù irtsitim," or "the luminary of heaven and earth,"[3] was god Sin. And "Sin" translates the Sumerian EN-ZU. In the Monolith Inscription of Shalmaneser II.[4] we have a god called "ilu Na-nir shame-e irtsi-tim," i. e., "the god the luminary[5] of heaven and earth." Hence there can be no doubt that EN-ZU is = Uru-ki = Sin = Nannar = Moon. What the name ZU means we cannot tell. It is explained in the syllabaries by "to know," "to be wise," "to learn," "to understand," etc., etc.

It may be probable that Gudea[6] of old was obliged to confess of Sin: ^{dingir}En-zu mu-ni galu-nu-gab-ne: "Sin—his name no man has ever disclosed, understood, explained," because he—Sin—treading his quiet path for all those ages past acquired in course of time a wisdom and knowledge so great that they cannot be

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[1] Does perhaps the ^{dingir}Dun-gur-(an) belong here, who is called the ^{dingir}En-temen-[an] (E. B. H. p. 118, note 1)? The temen-an, the "foundation of heaven," would be the "*earth*." But a ba'al of the soil is quite different from a ba'al of the earth. See however below!

[2] IV. R. 9 $\frac{3}{4}$–$\frac{17}{18}$a. [3] V. R. 64, 18. [4] III. R. 7, col. I. 2.

[5] "Die göttliche Leuchte," or "der göttliche Leuchter."

[6] Gudea, Statue B. VIII. 49 (K. B. III^1. p. 46).

disclosed, for he saw many things which nobody else has seen and heard many things which no man ever could have heard—in short "Sin was the god who not only could not be disclosed, or understood, but who also did not disclose, open, betray anything himself."

This god "who passes our understanding" had two children, UD and dingir Innanna. The god UD "the bright, or shining one," is called in the oldest inscriptions, "the king filled with splendor,"[1] and is identified in the later inscriptions with the god Shamash or "the sun." His sister or wife—for that is the same in the oldest inscriptions[2]—is the "goddess of Innanna." What the Innanna was we cannot tell as yet. She was later on identified with the "evening star" as well as with "the morning star," the former being the precursor of the moon, the latter that of the sun. As "morning star," which leads the king out to battle, she was considered in later times to be a male, a god, but retained her feminine name and was called either Ishtar or A-nu-ni-tum bêlit tachâzi.[3]

This latter title she had already in the oldest inscription, where she is called "nin mè,"[4] i. e., mistress of battle—hence *feminine!* It may not be impossible that even in the oldest time dingir Innanna was assigned to both functions, viz., to that of "the evening star," thus becoming "the goddess of love," and to that of "the morning star," as such being called the mistress of battle. The Innanna then would express the function common to both: the morning and the evening star. This function in every case must be a double one: the morning star announces the end of the night but also the beginning of the day; the evening star in like manner shows that

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[1] See, e. g., Gudea, Statue B. VIII. 63 (K. B. III[1]. p. 46): lugal-zal-sig-ga. E. B. H. p. 76 *et passim.*

[2] See above Enlil and Ba-u—both "the firstborn of An," hence brother and sister, but also husband and wife.

[3] A good example of this may be found in Nabû-nâ'id, Thoncylinder aus Sippar, A.-W. *Keilschrifttexte*, p. 42, col. III. l. 23 ff., where A-nu-ni-tum is treated both as a masculine and a feminine deity.

[4] Gudea, Stetue B. VIII. 61 (K. B. III[1]. p. 46).

the day is at its close and that the night is beginning.[1] The god Nin-Gir-su, the city-god of Girsu, whose real name we do not know as yet, was, as we have seen, a son of dingir En-lil, hence, a brother of god ZU, i. e., Sin or the moon, hence also, the ʿam, the "father's brother" of UD.

Who is this Nin-Gir-su?

Hommel[2] identified him with Nergal. Jensen,[3] with Ninib, the god of war. In another place[4] he reaches the same conclusion by the following consideration: The temple which Ur-Ba-u and Gudea built for Nin-Gir-su was called E-ninnû, i. e., the temple of the number fifty, and ninnû is again = Ninib.[5] This E-ninnû was also called E dingir Im-gig-ghu-bar-bar. From this Jensen concludes (*l. c.*): "dingir Im- etc. ist eine Erweiterung des Namens. Die Gruppe ist zu deuten: (des Gottes) welcher den finstern (gig) Himmel (im) erhellen (bar-bar) möge (ghu), und spielt auf Ninib als die Frühsonne an." This explanation was also accepted by me in my E. B. H[6].

Thureau-Dangin,[7] on the other hand, separated the latter name into dingir Im-gig-ghu and bar-bar, i. e., "the divine bird Im-gig" and "bright," the bird he identified with the eagle, the well-known emblem of Shir-pur-la—Girsu, referring at the same time to M. Heuzey, *Origines orientales*, p. 41, where an imprint of a seal-cylinder is published which is said to contain a representation of Nin-Girsu as described by Gudea in his celebrated dream. On account of the importance of the passage in Gudea's dream it might seem well to examine it more closely.

Gudea has a dream[8] in which appears to him a "man." The description of this "man" is given in all its details. Gudea does not know this "man" who had commanded him to build the temple

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[1] See the sign SUCH (= Innanna) V. R. 44, l. 14. 15, and H. W. B. p. 541 sub. פרכה IV. 1.

[2] Identität, etc., p. 222. See above, p. 597 sub 7.

[3] K. B. III[1]. p. 19, note **, where he quotes II. R, 57, 74.

[4] K. B. III[1]. p. 23, note *†. [5] V. R. 37, 18.

[6] See p. 182, note 1; p. 185, note 10. [7] Z. A. XV. p. 52.

[8] Zimmern, Z. A. III. 232–235. E. B. H. p. 189. Thureau-Dangin, Z. A. XV. p. 50. *Songe de Goudéa*, C. R., 1901, p. 112.

E-ninnû. He therefore addresses goddess Ninâ for an explanation of the dream, and she informs him that that man was her brother "Nin-Girsu."

The description which Gudea gives of "the man," reads[1]:

14. shag ma-mu-da-ka (ga)lu-I-a-an an-gim RI-BA-ni
15. ki-gim RI-BA-ni
16. A-NE sag-ga-ni-ku dingir-ra-an
17. id-ni-ku dingir Im-gig-ghu dam
18. sig-ba-ni-a-ku A-MA-SHUB-kam
19. zi-da gub-na UG ni-nad-nad
20. e-a-ni ru-da ma-an-dug
21. shag-ga-ni nu-mu-zu[2]

Which might be translated:[3]

14. In the midst of my dream (behold): A man—like the heavens his RI-BA
15. like the earth his RI-BA—
16. A-NE above him—surely a god!
17. At his sides there was dingir Im-gig-ghu,
18. At whose feet there was an A-MA-SHUB
19. At the right and his left an UG was couched
20. His house to build he commanded me
21. Him (lit. his heart) I did not know.

The goddess Ninâ, when explaining to Nin-Gir-su the meaning of this dream, uses the following words[4]:

13. (ga)lu an-gim RI-BA ki-gim RI-BA-ku
14. sag-ga-ku dingir id-ni-ku
15. dingir Im-gig-ghu-ku sig-ba-a-ni-ku A-MA-SHUB-ku

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[1] See especially Thureau-Dangin, Z. A. XV. 51.

[2] Gudea, Cyl. A. IV. 14–21.

[3] Thureau-Dangin, *l. c.*, and *Songe de Goudéa*, p. 119, translates:

"Au milieu de (mon) songe, un homme grand comme (so no doubt better than the 'dont la taille égalait' in Z. A.) le ciel.
Grand comme (Z. A.: dont la taille égalait) la terre
Sur la tête de qui était une *tiare* (Z. A. . . . for tiare) divine
À côté de qui était l'oiseau divin IM-GIG
Aux pieds de qui était un ouragan
À la droite et à la gauche de qui un lion était couché
M'a ordonné de construire sa maison:
Je ne l'ai pas reconnu."

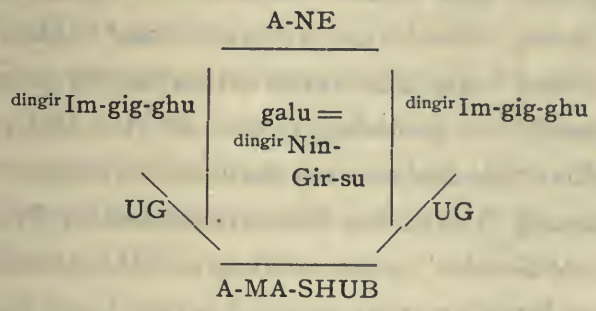
[4] Cyl. A. V. 13–18.

16. zi-da gub-na UG ni-nad-[1]nad-[1]a
17. shesh-mu dingir Nin-Gir-su ga-nam me-a-an
18. esh E-ninnû na-ru-ba za-ra ma-ra-an-dug.

Which when translated would read :[2]

13. The man : like the heavens in RI-BA like the earth in RI-BA
14. With that head—the god—at his sides
15. with a dingir Im-gig-ghu, at his feet with an A-MA-SHUB—
16. at the right and his left an UG being couched—
17. my brother dingir Nin-Gir-su surely is he,
18. the house E-ninnû to build he has commanded thee.

If we would draw a picture of the "man" Nin-Gir-su, we would have to do it as follows:



Intentionally some words were left untranslated above, because on the right interpretation of them depends everything.

A-MA-SHUB is, as Thureau-Dangin[3] has shown, the Semitic-Babylonian a-bu-bu, "stormflood."

dingir Im-gig-ghu, if translated word for word, would mean : god cloud, dark or black, bird or flying.

The two words suffice to show us that "the man" or Nin-Gir-su when appearing to Gudea was upon a "stormflood" and surrounded by "flying dark clouds." If bar-bar be added to E-dingir Im-

[1] The inscription gives SÀ-SÀ, which, no doubt, is a mistake for NAD-NAD, as is apparent from above, col. IV. 19.

[2] Thureau-Dangin, *Songe*, p. 120, translates :

13. l'homme grand comme le ciel, grand comme la terre
14. sur la tête de qui était (une *tiare*) divine, à côté de qui
15. était l'oiseau divin IM-GIG, aux pieds de qui était un ouragan
16. à droite et à gauche de qui un lion était couché
17. c'est mon frère, NIN-GIR-SU :
18. il t'ordonnait de construire sa demeure, l'E-ninnû.

[3] Z. A. XV. 51, note 5.

gig-ghu, we get the name of the temple E-ninnû dedicated to Nin-Gir-su. And because the E-ninnû is called the temple of DINGIR Im-gig-ghu-bar-bar, it follows that the latter name was also a surname of Nin-Gir-su. From this it also follows that "the flying dark clouds" are or may become sometimes "very bright"!

The UG, which are at the left and the right side of "the man's" feet will and must signify a similar thing. Now, I do not think that Thureau-Dangin is right in translating UG by "lions," although UG may have that meaning. Thureau-Dangin[1] himself says: "Il est probable que UG-GAL est identique à UD-GAL." UD has also the reading UG! And UD or better UG-GAL is translated by ûmu and means "storm" or "great wind."[2] UG alone would mean "wind" or "storm" too.[3] The A-NE at the head of this "man" might be taken either as the plural of A, i. e., "rain," "waters," or probably better as A + BIL, i. e., "water and fire." What this fire was we shall see directly.

The remaining RI-BA has been translated by Thureau-Dangin in his "*Songe de Goudéa*" quite correctly. It no doubt means that the man was as large or great as the heavens[4] and earth, extended over heaven and earth; his course[5] was so wide and so large that it went all over the heavens and the earth.

Thus the description might be interpreted as follows: There appeared a "man" to me who was as regards his size as large and extended as the heavens and earth. Rain and fire were above him! At the sight of which Gudea is completely awe-stricken and is forced to exclaim: Surely it is a god!—such impression this rain and fire made upon him. At his sides were, i. e., he was surrounded by "flying dark clouds" and was carried by a "stormflood," and

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[1] Z. A. XV. p. 49.

[2] Delitzsch, H. W. B. p. 33.

[3] Cyl. A II. 9; Ur-sag ug zig-ga gab-shú-gar nu-tug dingir Nin-Gir-su, I would translate accordingly: Oh warrior, Oh furious tempest, who has no rival, Oh Nin-Gir-su! etc. Comp. also Cyl. A IX. 21 (Nin-Girsu) ur-sag-gal ki-dingir En-lil-lal-ka en gab-ri nu-tug, "the great hero in the domain of En-lil, the lord without equal."

[4] See also Cyl. A. VII. 4, 5, en-na shag an-gim sud-du-ni dingir Nin-Gir-su dumu dingir En-lil-lal, i. e., "the lord whose heart is as extended as the heavens: Nin-Gir-su, son of En-lil."

[5] Ri-ba = rib-ba (Thureau-Dangin, l. c. p. 51, note 3) = אתה. H. W. B. p. 159.

at his feet there were two "storms" or "tempests." The only god whom such a description fits is of course *Rammân*. That this Nin-Gir-su cannot be any other but Rammân is corroborated by the following considerations:

1. Nin-Gir-su has a special servant: the god Nin-sar who is called the gir-lal ^{dingir}Nin-Gir-su-ka.[1] Gir is=birqu, "lightning," "thunderbolt," and lal=nashû, "to lift up, carry," or=shapâku, "to pour out." Nin-Gir-su thus is not only the god of rain and storm, but also the god of lightning, or else he could not have a "thunderbolt carrier," who occasionally may "pour out" the thunderbolts. In old Babylonian times there also existed a ^{dingir}Nin-Gir,[2] who, no doubt, is the same as the ^{dingir}Nin-sar, for Nin-Gir means the "lord of the Gir or thunderbolts." The GIR or "thunderbolt" is also contained in Nin-GIR-su as well as in GIR-su! Even the bar-bar of ^{dingir}Im-gig-ghu-bar-bar indicates the brightness and flashes of the lightning or thunderbolts.[3] This is also the reason why I would read for A-NE=A-BIL.[4] Nin-Gir-su=Rammân appears unto Gudea in rain, storm, and fire, i. e., flashes of lightning.

2. The "dream" itself of Gudea speaks for our interpretation. The opening of Cylinder A describes the terrible drought of Girsu-Shirpurla, which can only come to an end by some pious deed of Gudea. And what is more natural for Gudea than to build a temple in honor of just the god of RAIN, storm, and lightning, that the drought might cease! And this god is Nin-Gir-su=^{dingir}Im-gig-ghu-bar-bar=Rammân, who promises thereupon that the drought shall cease after the temple has been built.[5]

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[1] Urakagina, Déc. XLIX.=E. B. H. p. 52, 23 (where we have to read for shag-lal=gir-lal as Déc. XLIX. clearly shows), so also E. B. H. p. 51 l. 14 ff. read: ^{dingir}Nin-sar gir-lal ^{dingir}Nin-su-gir-ra, and see already above, p. 590, 6.

[2] See the proper name Ur-^{dingir}Nin-gir, E. B. H. p. 413.

[3] See also Cyl. A. XI. 3, where E-ninnû is called ^{dingir}Im-gig-ghu an-sar-ra shegg-gì-gì, "the Im-gig-ghu that flashes over the whole heaven," and comp. with this Thureau-Dangin, *Songe de Goudéa*, p. 14, note 1.

[4] Notice also that a *flame* (BIL) is Nin-Gir-su's sign. Cyl. A XII. 10.

[5] Thureau-Dangin, *Songe de Goudéa*, col. XI.! The rains will be announced by a wind, *ibid.*

3. If my interpretation be correct—and there can hardly be a doubt about its correctness—I would explain the dingir IM[1] the well-known ideogram for Rammân to be simply a further abbreviation of dingir Im-gig-ghu or dingir Im-gig-ghu-bar-bar respectively.

4. Now we also understand the so-called second triad of the Babylonian gods; they are ZU, UD, and X = Nin-Gir-su, or in Semitic: Sin, Shamash, and Rammân. This is the common sequence in which they occur. Sin is the head or abu,[2] Shamash his son, and Rammân is the 'am, the "father's brother." Here then we have the other racht! If the enumeration be: Sin, Rammân, Shamash,[3] it would be parallel to Anu, Ea, Bêl, i. e., the two brothers mentioned first, and then the son of the former.

The two triads of the Babylonian pantheon are two rachts and parallel to each other; they go back to the oldest times of the Babylonian history—another proof for the great age of the Sumerian civilisation!

dingir Ba-u, the wife of dingir Nin-Gir-su, had seven sons,[4] who were at the same time the "banda" of Nin-Gir-su.[5] What these "seven sons" stood for, is hard to tell. Three possibilities might be taken into consideration:

(1) They represent the seven planets.[6]

(2) The seven Igigi, or spirits of heaven.

(3) The seven winds or evil spirits, who are closely connected with Rammân.[7]

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[1] For references see E. B. H., Index, Gods, p. 443 sub I.

[2] This fact explains why Sin is called in the celebrated Moon-hymn (IV. R. 9) abu. He is the head, for this means "abu" here, of the racht. The abu = father (of the gods) is En-lil, as was seen above. See also Winckler, M. V. A. G., 1901, 4, p. 20. In later inscriptions the following gods are called abu ilâni; Bêl, Ashur Anu, Ea and Sin. See H. W. B. sub. abu, p. 3.

[3] As e. g. in the Black Obelisk of Shalmaneser II. ll. 6, 7.

[4] See above, p. 590, note 6. [5] Gudea, Cyl. B. XI. 4–12.

[6] That the Babylonians knew also of *seven* planets besides sun and moon, and not, as Winckler thinks, *always* of five only (with sun and moon = seven), is evident from the figures of the Kudurru of Nabu-shum-ishkun, now in the Berlin Museum. There we have "the sun," "the moon," "the morning star," and "the *seven* planets."

[7] See, e. g., IV. R. 5, 29 ff., Delitzsch, H. W. B. p. 33 sub. ûmu, and Winckler, *Der Alte Orient*, III. p. 95.

I myself would rather see in them the seven winds, cp. e. g., the name of the third son Ur-kalam-ta-ud-du-a, i. e., "the one who (a) goeth forth (ud-du) out of (ta) the foundation (ur = ishdu) of the earth (kalam), as such he, no doubt, is the same as the Gim-nun-ta-ud-du-a, "the one who goeth forth out of the abode or building (GIM) of the NUN (or ocean)," mentioned already by king Uru-ka-gi-na at about 4500 B. C.[1] Both would signify the "*east*-wind," as coming from the Persian Gulf. Nin-sar, too, would speak for the winds, storms, lightnings, that accompany Rammân. By Urukagina are also mentioned the Za-za-ru[2] or first son, the Im-pa-ud-du[3] or second son,[4] and the Nin-sar. This latter I take to be not only the same as the dingir Nin-gir but also as the dingir GHE (or GAN)-gir-nun-na—the one is the gir-lal, "thunderbolt carrier," the other is the "lord of the thunderbolt," and the third has at least something to do with the GIR as the name Ghe (or Gan)-GIR-nun-na indicates.[5] The fifth son Ghe (or GAN)-shag-ga probably is identical again with the Dun-shag-ga, who, as we have seen, is called "a son of Nin Gir-su."[6] Ka-úr-mu, the sixth, and Za-ar-mu, the seventh son, are known to me only from this passage.

The dingir Gàl-alim, from whom Gudea receives "dominion and a great scepter,"[7] and who, as we have seen, is also a son of Nin-Gir-su, I would like to identify with Nin-sar the gir-lal of Nin-Gir-su. Gudea, no doubt, wants to say by this, that he has received a scepter like that of Nin-sar, i. e., "a thunderbolt," by means of which he was able to *reign* and put down, if necessary, his enemies.

That some of the sons of dingir Ba-u are mentioned already by

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[1] E. B. H. p. 54. [2] E. B. H. p. 53. [3] E. B. H. p. 53.

[4] Is this Im-pa-ud-du perhaps identical with the Dun-pa-ud-da, E. B. H. p. 312, 3_{14_2}? See also Gin-dingir Dun-pa-ud-du and Ur-dingir Dun-pa-ud-du.

[5] The name of this god is also found in a shortened form, see E. B. H. p. 52, l. 27, where we have to read according to Déc. XLIX. [dingir GH]e (or [GA]N)-gir ki-ag dingir Nin-Gir-su-ka-ra.

[6] E. B. H. pp. 195, 196.

[7] Gudea, Statue B. II. 18, 19: nam-ner-gàl pa-magh sum-ma dingir Gàl-alim-ka-ge (K. B. III[1]. p. 28).

Uru-ka-gi-na,[1] shows that the whole system of the Babylonian theogony was fully developed as early as 4500 B. C.

This Nin-Gir-su, this god of lightning, thunder, rain, and storm, was "the warrior," or "mighty hero"[2] of Bêl or En-lil. En-lil has indeed a strong hero! From this follows, that whenever Bêl appears, he is accompanied by Nin-Gir-su, i. e., Bêl appears in company with lightning, thunder, and clouds. And who does not think instantly of the יהוה of the Old Testament who too appears in company of such an "ur-sag lig-ga?" Exod. xiv. 19 ff. we read (R. V.):

"And the *angel of God*, which went before the camp of Israel, removed and went behind them: and *the pillar of cloud* removed from before them and stood behind them: and it came between the camp of Egypt and the camp of Israel: and there was the *cloud* and the *darkness*, yet gave it *light* by night."

Can we possibly have a more striking parallel to the dingir Nin-Gir-su ur-sag lig-ga dingir En-lil? The *ur-sag* or "warrior" corresponds to "*the angel.*" Nin-Gir-su is the ur-sag of *En-lil*, and here we have the "angel of *God*," i. e., יהוה! But "the angel" appears here under a *cloud.* Nin-Gir-su is called dingir Im, i. e., "*the cloud.*" The "cloud REMOVED from before them and stood behind them. dingir Nin-Gir-su is called "the *flying* Im-gig. This cloud was *darkness* and *light*, Nin-gir-su is called dingir Im-gig-ghu-bar-bar, i. e., "*dark cloud* flying, flashing up, or *very bright.*" Hence there cannot be any doubt that "the angel of God" is the ur-sag of יהוה and thus a striking parallel to the old dingir Nin Gir-su. But from this it also follows that יהוה himself is *no storm-god* as Stade[3] and Winckler[4] think, but the *storm-god* is "the angel" or the *ur-sag*, i. e., Nin-Gir-su, who accompanies En-lil or יהוה. En-lil or יהוה is the Bêl, "the Lord" κατ' ἐξοχήν must therefore necessarily be accompanied by his special "ur-sag" or "angel" and this is "the thundering and lightning dark cloud," hence יהוה is usually represented

[1] Were it not for the fact that the "barrel-cylinder" is broken, we might have found mentioned on it all seven sons.

[2] The ur-sag, or ur-sag lig-ga, see above, pp. 590, 579.

[3] *Geschichte des Volkes Israels*, Vol. I., 429 ff.

[4] *Geschichte Israels*, Vol. I., p. 37 ff.

as coming in the company of just such a cloud.[1] En-lil as "king of heaven and earth" and "king of the gods" speaks and acts only through his ur-sag, i. e., lit. translated "head-servant," "prime-minister,"[2] so יהוה "the lord of hosts" speaks also through HIS "head-servant" or "prime minister": the מלאך—and what this "prime minister says or does, that says or does יהוה or En-lil. Hence we read Psalm xviii. 6 ff. (R. V.):

6. In my distress I called upon the Lord,
   And cried unto my God:
   He heard my voice out of his temple,
   And my cry before him came into his ears.[3]
7. Then the earth shook and trembled,
   The foundations also of the mountains moved
   And were shaken, because he was wroth.
8. There went up a smoke out of his nostrils,
   And fire out of his mouth devoured:
   Coals were kindled by it,
9. He bowed the heavens also and came down.[4]
   And[5] thick *darkness*[6] was under him,
10. And he rode upon a cherub, and did *fly*,[7]
    Yea, he *flew*[7] *swiftly* upon the *wings*[7] of the *wind*,[8]

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[1] See, e. g., Isaiah xix. 1 (swift cloud, R. V.); and the different passages about "the whirlwind."

[2] See here especially Gudea, Cyl. A. II. 11, 12:

dingir Nin-Gir-su zu-ab-a....
En-lil-ki-a (?) ner-gàl (?)

Which Thureau-Dangin translates (*Songe de Goudéa*, p. 116).

ô Nin-gir-su, toi qui dans l'abîme....
toi qui à Nippur es *au premier rang*.

Nippur is the city of *Enlil*, and there Nin-gir-su has "the premier rang," i. e., he is the ur-sag or מלאך, the "head-servant" or "prime-minister" of Bêl-Enlil.

[3] As soon as יהוה—En-lil hears the crying, he dispatches his "prime minister," the ur-sag. The ur-sag, taking here the place of יהוה—En-lil, because he *acts for* him,—comes under thundering and lightning.

[4] The ur-sag, so far thundering above, approaches the earth.

[5] The ur-sag is upon the earth, the poet sees him and describes him,—like Gudea of old!

[6] Comp. the a-ma-shub or "storm flood," and the IM-GIG of Nin-Girsu.

[7] Comp. the GHU, "flying," in Gudea's Imgig-GHU.

[8] Comp. the UG, "storm," "tempest," which are at Nin-Girsu's feet.

11. He made darkness his hiding-place, his pavilion round about him,[1]
Darkness[2] of the waters,[3] thick clouds of the skies.
12. At the brightness[4] before him his thick clouds passed,
Hailstones and coals of *fire*[4]
13. The Lord[5] also thundered in the heavens,
And the Most High uttered his voice:
Hailstones and coals of fire.
14. And he[6] sent out his *arrows* and scattered them;
Yea, *lightnings* manifold, and discomfited them.

That this description must be understood of the מלאך יהוה and not of יהוה himself, is evident from the "angel of god" in Genesis chapters 18 and 19, who speaks and acts like יהוה and who (he is called here simply יהוה) rains upon Sodom and Gomorrah *brimstone* and *fire* מֵאֵת יהוה מִן הַשָּׁמָיִם.[7] This "from heaven" is no gloss, as some commentators want it, but indicates that יהוה *himself* is somewhere else, while acting through his prime-minister or מלאך, who therefore, as his (Jahveh's) representative, is called יהוה too!

A further corroboration of this may be found in Gudea, Cyl. A IX. 20—X. 5,[8] where the "lugal A-MA-SHUB," the "king of the stormflood," is said to be dingir En-lil or Bel.

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[1] The Im-gig-ghu or "the flying dark clouds" surround Nin-Gir-su.

[2] Comp. the a-ma-shub or "storm-flood," and the IM-GIG of Nin-Girsu.

[3] Comp. the A or "water" which is "above" Nin-Gir-su.

[4] Comp. the BIL, "fire," that is "above" Nin-Gir-su, and the bar-bar in Im-gig-ghu-bar-bar.

[5] יהוה or En-lil through the "ur-sag."

[6] The "ur-sag" or "angel" or "prime-minister" makes use of his gir-lal, i. e., of dingir Nin-sar, bids him to pour out or send out (shapâku) his gir or "lightnings, thunderbolts."

[7] Gen. xix. 24.

[8] Translated by Thureau-Dangin, *Songe de Goudéa*, p. 125, as follows:

IX. 20. Moi je suis Nin-Gir-su qui *écarte*....
21. le grand héros auprès de Bel,
22. le seigneur sans rival;
23. mon temple (est) l'E-ninnû où moi....
24. mon arm le SHAR-UR qui sous son pouvoir réduit les contrées
25. mon IGI-GHUSH qui n'épargne rien au monde,
26. mon DA-BAT à qui personne n' échappe
X. 1. .....(This line reads: A-KU-mu nam-gal ki-ag-da)
2. "LE MAITRE DE L'OURAGAN (EST) BEL (!!)"
3. "son œil irrité (i. e., the IGI-GHUSH) n' épargne rien au monde"

The "weapons"[1] used by Nin-Gir-su and which are mentioned in the above-given passage, are no doubt the lightning, thunderbolt, etc., etc. There can be, then, no doubt that יהוה has his exact counterpart in dingir En-lil, and that the latter's ur-sag is the מלאך יהוה of the Old Testament. Thus יהוה is not a "*god of storm*," but "the lord who is accompanied *by* the storm,"—a difference!

But what or who is this dingir En-lil—יהוה? Hommel[2] takes dingir En-lil to be the "Herr der Luft," because LIL = zaqîqu[3] = Sturmwind, wind, and the kur-kur in lugal-kur-kur as signifying "die Berge des Luftreichs, die Wolken." This latter he derives from the signification of dingir Nin-char-sag and the surname of Bel: KUR-GAL, "the great mountain."[4] Against this might be said that a zaqîqu or *wind* is not yet "*air*," and that in later (Assyrian) inscriptions the lugal-kur-kur is always translated, not by shar shadê, but always ilu bêl mâtâti.[5] On accout of this latter translation LIL was taken to signify "the lord of the lands." The main attributes of Enlil were, as we have seen, "the king of heaven and earth," "the king of the lands," "the king of the gods," "the father of the gods." As time went on, these specific attributes of Enlil were applied even to other gods according to the influence they were able to exercise over the inhabitants of early Babylonia. Thus it happens that, e. g., the moon-god Sin had the following arrogant titles:

ilu Sin bêl ilâni sha shame-e u irtsi-tim
shar ilâni ilî (written ilu + pl.) sha ilâni
a-shi-ib shame-e rabûte.[6]

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4. "Nin-Gir-su guerrier de Bel"
5. de ces noms seront nommés.

[1] See also Gudea, Cyl. B VII. and Statue B V. 37; VI. 49 *et passim*.

[2] Identität, etc., p. 219.

[3] Ungar. lel anima, türk. yel, "Wind," Hommel, *ibid.*

[4] *Ibid.*, p. 220.

[5] See, e. g., Obelisk of Shalmaneser II., l. 3: ilu bêl-mâtâti ilu Bêl.

[6] "Sin, the lord of the gods of heaven and earth,
the king of the gods, the god of gods
that inhabit the great heavens."
Nabû-nâ'id, Thoncylinder aus Ur. A. W. p. 43. col. I. 28 ff. Sin is the bêl ilâni in as far as he is the "head" or ab of the second triad or racht, this also implies

Yes, when god Marduk occupied the most supreme place in the Babylonian pantheon, Nabû-nâ'id does not know how to honor him more than by calling him dingir EN-LIL ilâni ilu Marduk (AMAR-UD),[1] which is generally transcribed ilu bêl ilâni ilu Marduk, and translated "the lord of the gods, Marduk,"—the original, and no doubt intended signification however is: "the EN-LIL of the gods (viz.:) Marduk." By thus terming his supreme god, Nabû-nâ'id wanted to show that Marduk takes the place of EN-LIL of old.

Above we have seen that "heaven and earth" were considered by the old Babylonians to be closely connected, so closely as to require only *one* god; and if there was only *one* god for "heaven and earth," then this latter must have been considered as *one*. This *one* thing, this heaven-earth, AN-KI, has, when thus looked upon as *one* the name LIL. The first triad, when enumerated has mostly the sequence Anu, Bêl, Ea, i. e., Bêl is mentioned between his father and his 'am "father's-brother." That just *this* sequence should have become a stereotyped one must have a meaning. The explanation of this sequence no doubt is the following: AN "the heavenly ocean," and KI "the terrestrial ocean" are separated according to the Bible (Gen. i.) by the so-called רקיע (*raqî'a*) generally translated by "firmament," which latter is there "to keep back the waters of the heavenly ocean." This conception however is only one-sided. For we may very well ask, if the heavenly ocean is kept back by a רקיע, by what is the terrestrial ocean kept back?

And when Job[2] complains:

> "Am I a sea or a sea-monster
> That thou settest a watch over me,"

he did not think so much of a "heavenly sea or sea-monster" that is to be guarded, but of an *earthly* sea or sea-monster. Thus we would necessarily expect that there was also a רקיע for the terres-

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the "god of the gods." With ilî (= pl!) comp. also the *pluralis majestaticus* אלהים. But the "king of the gods" is an attribute of En-LIL.

[1] Nabû-nâ'id, Thoncylinder aus Sippar, A.-W. p. 40, col. I. l. 21.

[2] Chap. vii. 12.

trial ocean. The רקיע of the heavenly ocean is called "heaven."[1] The "heaven"[1] or "the firmament of heaven"[2] keeps back the waters above. The רקיע השמים itself proves that there must have been also another רקיע besides that of heaven—or else the השמים would, to say the least, be quite unnecessary. Thus, even P. still was under the impression that there existed a רקיע השמים and, of course, as we may conclude a רקיע הארץ. As the one רקיע is the "heaven," so the other רקיע is the "earth." This *one* רקיע that stands *between* the heavenly and terrestrial ocean, and keeps back the waters above the firmament as well as below the firmament is called by the Sumerians: LIL.

Thus we understand the succession: AN-LIL-KI or Anu, Bêl, Ea it stands for: the heavenly waters—the רקיע—the terrestrial ocean, by the רקיע they are divided, by it they also are kept back, the heavenly ocean by the רקיע which is the "*heaven*" and the terrestrial ocean, by the רקיע which is the "*earth.*" Thus it also happened that according to P[3] the heaven had to have "windows" (ארבת השמים) through which the waters of the heavenly ocean could pour down at the time of the flood, and the "terrestrial ocean"—the תהום רבה as he calls it—had likewise to have some exit through which the waters might come, and these exits are the "wells" or מעינות. From this is also evident that not only the heavenly ocean was "kept back" but also the *terrestrial* ocean—the heavenly by the heaven and the terrestrial by the earth: heaven and earth thus form the רקיע or LIL. And EN-LIL standing between the AN and KI, i. e., "the heavenly and terrestrial ocean," becomes thus the רקיע, and the latter again under a twofold aspect: the heaven and earth—hence he is "the king of heaven and earth," or of the רקיע that stands between the AN and KI!

Having traced the genealogy of the gods and inquired into their specific meaning, we are now able to establish the following pedigree:

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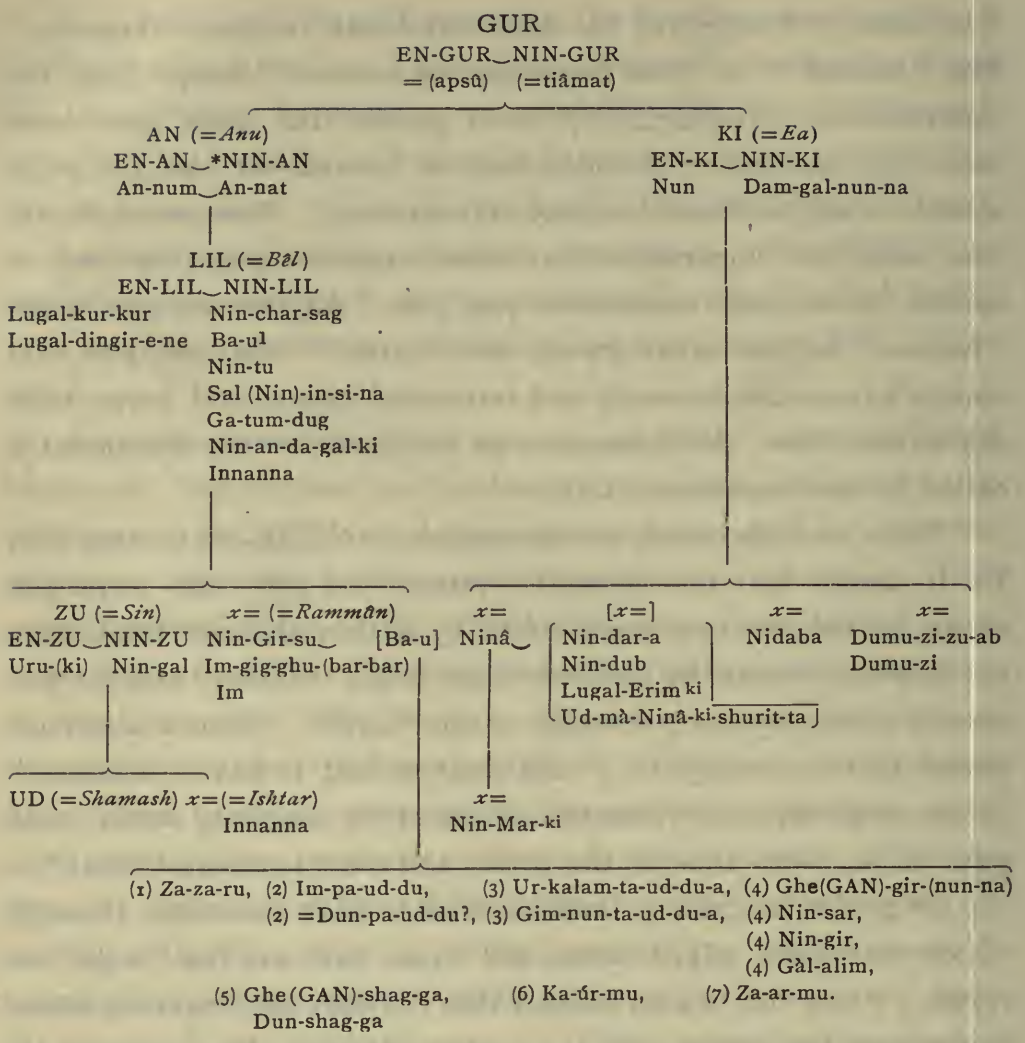
[1] ויקרא אלהים לרקיע שמים, Gen. i. 8.

[2] מארת ברקיע השמים, Gen. i. 14.

[3] Gen. vii. 11.



Of dingirNin-ib the pa-te-si-gal dingirEn-lil-lal-ge,[2] Nergal[3] or also known under the name dingirShit-lam-ta-ud-du-a,[4] and Nusku the lugh-magh dingir En-lil-lal[5] we know too little to be able to classify them, if we want to do it according to the Old Babylonian inscriptions. Nabû does not occur at all.[6]

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[1] Other names for Ba-u to be found in Old Babylonian inscriptions are : Da-mu, Dun, Gu-la, Ma-ma, Nin-din-dug (probably to be read, however, Innanna-edin,) Za-ma-ma. See E. B. H. Index.

[2] E. B. H. p. 258_{22}.

[3] Written dingir GIR-UNUG-GAL, for this reading, and not : Nir-unug-gal, see Thureau-Dangin, Z. A. XV. p. 47, and note 2. For references see E. B. H. p. 226_3.

[4] E. B. H. 133_{30}, 224, 227_1.

[5] E. B. H. p. 223, note 3.

[6] The inscription of Ardi-Na-bi-um belongs to a later (Canaanitish or Aramæan) period, as the name Ia-lu-un-a-sar shows. E. B. H. p. 229.

If we translate this genealogy and compare it with that of Gen. i. we would get the following result:

In the beginning there was a *chaos* which was thought to be a *male* and *female*, perhaps in one person. The Biblical name for this chaos was tohu-vabohu, but as male and female it was called either "waters" and "Tehom," or "Spirit of Elohim" and "darkness." In the Babylonian account the names apsû and tiâmat are used, while in the original Sumerian the chaos was simply called GUR which at one time or another was differentiated and became "Mr. Gur" and "Mrs. Gur," i. e., EN-GUR or NIN-GUR. From these first parents everything in heaven and upon earth took its origin. EN-GUR and NIN-GUR had two sons: AN and KI, i. e., they begot the "heavenly ocean" and the "terrestrial ocean." In the Babylonian-Semitic account the two sons were called AN-SAR and KI-SAR, who again probably correspond to the Lachmu and Lachamu. Genesis i., on the other hand, calls them "waters that are above the firmament" and "waters that are below the firmament." According to all three accounts, these waters take their origin from Tehom,[1] i. e., the descent is reckoned through the mother.

AN, the "heavenly ocean," has a son called LIL, i. e., the רקיע or firmament. The Sumerians reckoned, as it seems, to this firmament also the "earth," for it was divided into "heaven" and "earth," which served as barriers for the heavenly and terrestrial ocean. In the Bible, however, the earth or dry ground is born by the terrestrial ocean. This was, no doubt, also the Sumerian conception, for KI does not signify simply the terrestrial ocean but also the earth. It may not be impossible, however, that LIL was thought to be a son of both:[2] of AN and KI,—for both oceans were

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[1] See above, pp. 602, 576.

[2] This probably explains why Marduk, who was, as we have seen, identified with EN-LIL or Bel, is called the aplu rêshtû sha Ea, II. R. 64d, comp. with 17c. d. and in Damascius: τοῦ δὲ Ἄου (i. e., Ea) και Δαύκης (i. e., Damkina) υἱὸς ὁ Βῆλος (i. e., according to later times the Bel κατ' ἐξοχήν: Marduk). See also Carus, *The Monist*, April, 1901, p. 406. That one son should have two fathers is not strange, it merely would presuppose polyandry with descent reckoned through the father. For a classical example see here the Minean inscription Hal. 504 = Hommel, *Südarabische Chrestomathie*, p. 94.

thought to be joined together beyond the firmament or רקיע,—this being simply the natural observation that the heaven rests upon the earth, and *mutatis mutandis*: the heavenly ocean upon the terrestrial. Remarkable also is that Ba-u together with LIL, her husband, are said to be "the firstborn" of AN,—surely an evident trace that the differentiation of the sexes was comparatively late. If LIL was the firstborn, then also his wife *had* to be the firstborn: both are thus husband and wife, and brother and sister.

The god LIL, by virtue of his being the רקיע or "heaven" and "earth," became the "*father*" and the "king of the gods of heaven and earth,"—not only of the gods, however, but also of all other creatures, as still may be seen from one of the attributes of his wife: Sal (Nin)-in-si-na who is called: "the mother of the world, the one who created the creatures of the world."[1] And as the attributes of the wife belong also to the husband, hence god LIL was, according to Sumerian conception, the creator or father of the *gods* and of the *creatures* of the world. The *gods* who are begotten by LIL are ZU or Sin, the moon-god, Rammân or Nin-Gir-su, "the thunderer" or simply "cloud," who again is the 'am of UD or Shamash, the sun-god, and Innanna or Ishtar, the morning or evening star. By Ba-u the wife of Rammân again are born the seven winds. Also according to Gen. i. "the two great lights and the stars" belong to the רקיע.[2] We now understand why P is so awfully afraid of naming these two great lights by name. He knew that they were the *sun* and the *moon*. He did not *want* to mention their names,—for if he did then he would have had to use for "sun" the Hebrew שמש (Shemesh), which apparently was too closely related to the Semitic-Babylonian Shamash and might have betrayed a heathenish origin of his (P's) whole cosmogony. The same may be said of Ishtar or עשתר! Shamash was at the time of P one of the *principal gods*,—and whatever smelled of heathenism was blotted out by P!

The terrestrial ocean according to the Sumerian cosmogony begets the fishes, the verdure, grain, etc. It ought to be noticed

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[1] E. B. H. p. 202, note I. 1.

[2] ברקיע השמים Gen. i. 14.

here that Ninâ or the fish-goddess is called the *sister* of Nin-Gir-su, hence stands with him on the same level. According to the genealogy given above, we would expect, however, that she would have been called the sister of LIL. This, no doubt, is due to the fact that LIL is the son, or was considered to be the son, of both AN and KI, thus standing between the latter two on one side and ZU, Rammân, and Ninâ on the other side. Also according to P the verdure, fishes, etc., etc., derive their origin from "the waters which are below the firmament," i. e. from KI!

Considering these striking similarities between the Biblical account of the creation story according to P and that of the Sumerians,—there can be no doubt, that the former is derived from the latter.

We would have to distinguish, then, in Genesis i. three different sources:

1. The *P source*. To this belongs the *system of seven days*, the *formula* given above and the different changes that were necessary in order to make the whole agree with the notions of P. The P source again was based upon

2. The *Semitic-Babylonian Creation Story*. This latter was used only in so far as it agreed with the conceptions—theological and otherwise—of P. All that was against P's conception was eliminated from it. While thus "*criticising*" the Semitic-Babylonian creation story, P quite unconsciously retained so much of it that he reproduced or came very near to the original

3. *Sumerian Source*, which source represented the creation not as the result of a *fight*, but as a natural process of *generation* and *perpetuation*.

Traces of No. 2 are: the conception of the original chaos as Tehom or darkness unto whom is opposed "the spirit of Elohim"; the *dividing* of the Tehom into the waters above and below the firmament, and last but not least, the אור or light,—the attribute of Marduk. To No. 3 belongs the *toledoth* or genealogy of heaven and earth, for the writer expressly says himself that what he has given in chapter one is a תולדות השמים והארץ, a generation and perpetuation of heaven and earth. In this sense תולדות *toledoth* has to

be understood, and thus we get a further corroboration of our statement that Gen. i. is not a "*creatio ex nihilo*," but a generation and perpetuation, a development out of the primeval chaos,—*an evolution.*

Thus the Biblical creation-story of P. is proved to be the redaction of a *Sumerian Theogony and Cosmogony.*

But where is Marduk? We have seen already above, that Marduk is not known in Babylonia *before* the time of the first dynasty of Babylon or about 2400 B. C. He then was imported by that dynasty which was of Canaanitish origin. Marduk therefore was probably a Canaanitish god. He was a *god of light.* The Canaanites seeing that there were in the Sumerian pantheon several gods of light as Sin, Shamash, Rammân, Ishtar, etc., made Marduk to be an "*attendant*," an AMAR of Shamash or UD—calling him AMAR-UD! This name expressed on one hand as nearly as possible the "*nature*" of the god, as well as on the other hand the sound of their own "*Marduk.*" When the Canaanites had in course of time subdued Babylonia and had made Babylon their capital with Marduk as the patron, Marduk became the *head* of all gods, "the king and father of the gods of heaven and earth," yes, he was called even $^{dingir}EN\text{-}LIL$,[1] thus he not only became identified with god LIL, but all attributes belonging to EN-LIL originally, were now ascribed to Marduk. EN-LIL was, as we have seen, also the "father of all creatures and their creator"—hence Marduk became the creator too, and he being at the same time the god of light, it happened that the Creation was conceived of in later times to be a *fight between* Marduk the Creator and the darkness or Tehom. Marduk, the god of light, and his fight with Tehom or Tiâmat becomes thus a specific Babylonian-Semitic-Canaanitish production, hence also one of late origin.

P. by thus criticising and eliminating the mythical element of this fight of Marduk and Tehom, becomes thus the *first higher critic.* If he did not succeed in presenting to us the original pure Sumerian Theogony and Cosmogony, this was due to the fact that

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[1] See above, p. 618.

he *criticised* with a *purpose*—criticised the *Babylonian* Semitic account to adopt it to his own *theory* of the Creation in *seven* days in order to establish for his *Sabbath*—and thus for all his laws and ordinances connected with the Sabbath—the greatest possible age.

But let us be *thankful* to this first of all *higher critics:* he has made it possible for us to follow up his account and trace it to its original source. Thus we have another striking example of P.'s late age. He lived in Babylonia, was therefore able to acquaint himself with Babylonian ideas and gave us an account of the Creation which together with his "10 antediluvian fathers" may be traced to the very oldest sources at our disposal: to the Sumerian Cosmogony and Theogony.

HUGO RADAU.

WATERLOO, ILL.

EDITORIAL NOTE.

Owing to the exigencies of space, some important additions made by Dr. Radau to the preceding article had to be left out. These principally referred (1) to the attributes of Bêl (p. 619), (2) to Rammân-Nin-Gir-su, and (3) to the precedence of SIN. The explanations in question demand a consideration of the Sumerian cosmology and, as Dr. Radau's article is incomplete without them, they will appear in the October *Monist*.

BOOK REVIEWS.

LES PHILOSOPHIES NÉGATIVES. (Bibliothèque de philosophie contemporaine). Par *Ernst Naville.* Geneva: Georg & Cie.; Paris: Félix Alcan. 1900. Pp., 263. Price, 5 francs.

Prof. Ernest Naville, the famous Egyptologist and Swiss thinker, lays before the public his views on the negative philosophies, of which he enumerates seven: Scepticism, Traditionalism, Positivism, Dualism, Criticism, Mysticism, and Eclecticism. It is strange to find positivism among the negative philosophies, and also traditionalism, but a closer inspection of the author's meaning will satisfy the reader that he understands by positivism mainly Comte's positivism, which, insisting that we have no knowledge except what the positive sciences offer, practically negates religion and philosophy, establishing what we would call agnosticism. Positivism and agnosticism in the French-speaking world are actually identical, and thus we ought to replace positivism by agnosticism. Traditionalism certainly ought to be regarded as positive, but here our author keeps in mind that an adhesion to traditions to the neglect of the positive work of investigation negatives the exertion of the inquiring mind, and thus acts as a bane on man's spiritual life. Mysticism, too, is of a positive nature, yet our author distinguishes between that mysticism which is justified, or rather as he says harmless, suffering thinking to have its way and allowing science to assert itself; while another kind of mysticism is morally and intellectually subversive by antagonising the thinking faculty. Similar explanations are necessary to understand the author's meaning as to the sense in which he understands dualism, criticism, and eclecticism. Professor Naville embraces the monistic position, but he does not condemn that kind of dualism which he characterises as analytical dualism, which does not slur over contrasts, and is the condition of empirical science. The term criticism, too, is used in a special sense, and is characterised as that tendency in man which destroys and does not help to build up.

Altogether our author takes a position in which he accepts Christianity, not in the letter but in the spirit, identifying it with a spiritualised monism which accepts the freedom of will as the basis of practical morality. While, upon the whole, no one will seriously criticise our philosopher, we might find fault with his terms as

easily leading to misconceptions. While we would say that scepticism is negative, we find in criticism a negativism which is highly recommendable and desirable. It is not the positive which is to be accepted because it is positive, but we must distinguish between that which is wholesome and good and true, be it positive or negative, and that which is false, injurious, and dangerous. Traditionalism, viz., a thoughtless clinging to traditions, is positive and bad; while criticism (if we understand by it the principle of being on our guard and not allowing ourselves to take anything for granted that is untenable or unworthy of credence) is negative and yet wholesome.

Naville does not bring out his position very distinctly and clearly, but even this attitude is a trait of his character. We might almost say that he is too amiable to assert his position strongly, and though he seems to be an admirer of that which is positive, and is anxious to negate the negation, he rather lets us guess his position by indirection than states it positively and directly. P. C.

DAS PROBLEM DES WELTSTOFFS BEI GALILEI. Von *Ernst Goldbeck. Vierteljahrsschrift für wissenschaftliche Philos. und Sociol.*, XXVI. Leipsic: O. R. Reisland. 1902.

Ernst Goldbeck discusses Galileo's conception of the world-stuff, showing how Aristotle discriminated between crude matter which is of the earth earthy and a celestial substance which if it could exist in itself would remain eternal and perfect. The celestial substance suffers, however, through the admixture with matter. Galileo is the first naturalist who plainly and openly discarded the Aristotelian views, leading to the conclusion of the sameness of all substance. In this way Galileo became the founder of the monistic view, which has now become universally established in science. We might add that the Aristotelian notion of the celestial substance is based upon a truth, and although untenable in the form in which it was set forth, especially by the Schoolmen, the Aristotelians of the Middle Ages, there is no scientist who would doubt the significance of another element in reality which contains the conditions that in Aristotle's opinion deserve the name celestial; but this element, which to the Greek philosophers seem to be mixed up with matter, is not a substance of any kind but it is Kant's "purely formal"; it is that which conditions the formation of things, that which regulates the relations which obtain between the several objects of reality, the mathematics of physics. Though the purely formal is not a substance, it is the most significant part of reality, and the ancient philosophers may be excused for calling it a substance. Certainly if the purely formal is considered in itself, and not in its combination with matter, it is both eternal and perfect; its laws, which are irrefragable in theory, suffer many adaptations and seeming modifications in their application to the material world, and hence this justifies in the Aristotelian doctrine of matter modifying the eternal and perfect by rendering it transitory and imperfect. P. C.

RELIGIONSPHILOSOPHIE. Unter Mitwirkung des Verfassers aus dem Dänischen übersetzt von F. Bendixen. Von *Dr. Harald Höffding*. Leipzig: O. R. Reisland, 1901.

Dr. Harald Höffding, in his *Philosophy of Religion*, claims that all positive religions are untenable, but that the nucleus of religion is worthy as well as capable of preservation. Such is the fundamental idea of a voluminous work elaborated with the now fashionable method of the theorem of the conservation of values: "Satz von der Erhaltung der Werte." Dr. Höffding is well known to our readers as the ethicist of Copenhagen, and his books are distinguished by keen thought and a radical tendency. We would, however, criticise his expression as contradictory; if the positive religions are untenable, we should think their nucleus would be untenable too. If their nucleus is untenable, then there are positive features in the religions which would remain untenable. The difference here is a difference of expression. Dr. Höffding calls the positive element in religions the dogmas which have to be taken on credit, even though they are contradictory to science. To him a religion which is based on ideas which are not in conflict with science seems to be a negative religion; he adopts the word *positive* as used not by Comte but by dogmatists of the Churches, and we think the term would better have been avoided in this connection. What he wished to say might be better expressed thus: That though the dogmatic form of the several religions must be considered untenable, the underlying idea is capable and worthy of preservation; and this underlying idea would be that element of religion which would stand the test in the furnace of scientific criticism. P. C.

DER STREIT DER PSYCHOLOGISTEN UND FORMALISTEN IN DER MODERNEN LOGIK. Von *Dr. Melchior Palágyi*. Leipzig: Verlag von Wilhelm Engelmann. 1902. Pages, 93.

Whether one agrees or disagrees with the author's conclusions, the survey which Dr. Palágyi has given us of the discussions now being carried on between the psychological and the formalist or mathematical parties in modern logic will be suggestive reading. The author claims that the preponderating interest which was until recently taken in experimental and psychological research is waning, and that the foremost thinkers of to-day are turning their attention with increased zealousness to the questions of logic and epistemology. The pendulum has reached its point of highest psychological elevation, and has at last begun its movement toward the other side. And gratifying as this tendency of the intellectual movement may in some aspects be, it is yet, the author thinks, attended with danger. The "psychological peril," he says, has been replaced by the "formalistic peril"; and it is his mission, therefore, to restore equilibrium.

Dr. Palágyi's discussions are conducted in connection with animadversions on Husserl's *Logical Investigations*, which to him are symptomatic of the present conflict between psychologism and formalism. His criticisms are in one special

aspect also of value in calling attention to the important labors of Bolzano (1781–1848) whom the author regards as the legitimate founder of modern formalism. In a concluding chapter, Dr. Palágyi discusses his own position with regard to the relations obtaining between psychology and logic.

CONTRIBUTIONS TO A PSYCHOLOGICAL THEORY OF MUSIC. By *Max Meyer, Ph.D.*, Professor of Experimental Psychology. Published by the University of Missouri. 1901. Pages, 80. Price, 75 cents.

There appears to be considerable competition between the American universities in the publication of series of original studies in the various departments of research, and during the past year the University of Missouri has also joined the ranks of the publishers of original theses. The present series is edited by Dr. Frank Thilly, Professor of Philosophy, and the first work is the present study of a *Psychological Theory of Music*, by Dr. Max Meyer, Professor of Psychology. Dr. Meyer contends that musical theory, if it is to be at all scientific, must be psychological; it is a department of æsthetics, and neither the physicists nor the physiologists can prove by physical or physiological laws why we must enjoy certain combinations of tones. The physical and the physiological concepts have their proper functions, but the æsthetic significance of music can consist only in their relation to psychological concepts. Furthermore, the author contends that the most important group of musical facts is the one referred to by the scientific term "melody"; there may be music without rhythm (note that of the Oriental peoples), there may be music without harmony; but there can be no music without melody. This, therefore, must constitute the starting-point of the psychologists' investigations. The fundamental error in musical theory, according to the author, is that the basis of all music is the so-called diatonic scale. It is this view, he believes, that has prevented the development of a scientific theory of music.

LE BASI NATURALI DELLA POLITICA E DEL DIRITTO. By *Avv. Arturo Bruchi*. Pitigliano: Premiato Stabilimento Tipografico Osvaldo Paggi. 1902. Pages, 114. Price, L. 1.50.

In this little brochure, Signor Bruchi has concisely discussed the natural foundations of politics and law. Whatever may be the value of the author's conclusions, he is himself personally certainly not lacking in a species of grim humor. With a sort of premonition of the fate of his work, he dedicates it to his "Four Readers." He remarks that whoever cares to read it should do so, not with the desire to be diverted, but with the purpose of thinking profoundly. He begs whomsoever may have the hardihood to attack his little work not to begin at the end and read backward to the beginning, after the fashion of the Chinese, but to begin with the first letter of the first paragraph and to pursue his penitential task to the bitter end. Believing that these conditions will be too exacting for the great majority of modern readers, he has placed the mathematical limit of his reading public at the

number four. Why not seven, or three, or none, does not clearly appear from his argument. But from so candid a preface one is led to expect much, and it is quite likely that Signor Bruchi will find a much larger circle of readers than his gloom has anticipated. *μκρκ.*

LES PRINCIPES DE LA MÉCANIQUE RATIONELLE. Par *C. de Freycinet*, de l'Institut. Paris: Gauthier-Villars, Imprimeur-Libraire. 1902. Pp., viii, 167.

In his customary clear and simple style M. C. de Freycinet of the Institute of France has here endeavored to give to the world a study of the principles of rational mechanics which shall restore that science to its ancient dignity. The prevailing spirit of treating the principles of mechanics is an entirely abstract one. Real physical bodies are neglected and systems are constructed in which mass and force play the part of mere algebraic entities: postulates and axioms are propounded, and the movements are sought which these systems are constrained to take conformably to the initial hypotheses. As an eminent geometer has said: "The dualism between force and matter which crept into the ancient mechanics is by this expedient avoided."

Now, in M. de Freycinet's opinion, the new ways of procedure are not absolutely trustworthy, and are certainly not favorable to the discovery of new laws. He believes it wise to hold to the traditions of Galileo and Newton, D'Alembert, Laplace, and Lagrange, and if there is any change to be made in the methods hitherto reputed classical it is preferable to emphasise even more strongly the experimental character of the principles and to throw still more prominently into relief the *physical* data on which they rest. Unquestionably mechanics as thus set forth is a "mixture" of mathematics and observation, tinctured "with some ingredients of anthropomorphism." But what branch of human knowledge, asks M. de Freycinet, can escape a similar censure? Does not every science bear the imprint of our intellectual concepts, and outside the domain of pure logic the imprint also of our sensations of the external world? The fecundity and certitude of a science ought, on the contrary, to be in direct proportion to the intimacy of its contact with nature. M. de Freycinet has accordingly endeavored to strike out again on the roads which the present generation appears to be abandoning. Instead of endeavoring to extenuate in any way the supposititious deficiencies above signalised, he has deliberately augmented them by giving more and more place to empirical considerations. The mixture of observation with mathematics above referred to as indicating a lack of unity will here be rendered still more apparent, though with the distinct hope that the supposed confusion will be lessened. According to M. de Freycinet, the experimental data are the beginning and the reason of the analytical theories; they invest them with that reality without which the most brilliant achievements of analysis are futile.

The book is within the mental reach of any one who possesses an elementary knowledge of mechanics.

GRUNDZÜGE DER PHYSIOLOGISCHEN PSYCHOLOGIE. Von *Wilhelm Wundt*, Professor an der Universität zu Leipzig. Fünfte völlig umgearbeitete Auflage. Erster Band. Mit 156 Abbildungen im Text. Leipzig: Verlag von Wilhelm Engelmann. 1902. Pages, xv, 553. Price, bound, 13 Marks.

This is the fifth edition of Wundt's great pioneer work in the systematisation and exposition of the technical methods of experimental or physiological psychology. It has been almost entirely rewritten, and now occupies three instead of two volumes. The first edition appeared twenty-eight years ago, when the situation in psychological science was essentially different from what it is to-day. At that time Fechner's *Psychophysics* was the only work in which a successful attempt had been made to treat philosophical problems of a psychological import by exact methods. It was predominantly the physiology of the sensory and nervous systems that in those days supplied the material for the new science, while to-day enormous contributions from every department in any wise correlated with psychology are at hand. To-day there are few persons who deny the appropriateness of applying the exact methods of physical research to psychological fields; in fact, the matter has gone so far that opinions are not at all in consonance regarding the legitimacy of some of the new directions of inquiry in this direction. Wundt has followed all these changes, and has been compelled to take account of them in the revision of his work. His own views also have partially changed, and the outcome has been a work which, as its author claims, is in all essential respects a new one. Wundt's *Physiological Psychology* has exercised the greatest influence upon the development of his favorite science. His was for years the institute in which most of the psychological students of the world were educated, and the universal character of his talents and the variety of his studies always tended to impart great breadth to the researches in this field.

THE ETHICAL ASPECT OF LOTZE'S METAPHYSICS. By *Vida F. Moore, M. S., Ph. D.*, formerly Fellow of Cornell University. New York: The Macmillan Co. 1901. Pages, iv, 101.

This brochure is No. 4 of the Cornell Studies in Philosophy. The author has endeavored to emphasise a fundamental aspect of Lotze's philosophy to which too little attention has been devoted in the past. Lotze's doctrine of man, according to this pamphlet, rests upon the concepts of Personality and Teleology, which concepts grow out of the ultimate category of the Good. The starting-point and goal of his thought is the synthesis of the Good, Reality, and Truth into an organic whole. The Good is not evolved out of, or added to, Reality; it is the ground of all Reality. Reality is but the mode of its activity. All Lotze's characteristic metaphysical doctrines grow out of these conceptions. "The Good, defined as Personality, prescribes every tenet of his doctrine of the world, of man, and of God. Thus in his own system is embodied Lotze's conviction that the true beginning of metaphysics lies in ethics."

THE ELEMENTS OF PHYSICAL CHEMISTRY. By *Harry C. Jones*, Associate Professor of Physical Chemistry in the Johns Hopkins University. New York: The Macmillan Co.; London: Macmillan & Co., Ltd. 1902. Pages, xi, 565. Price, $4.00.

A new branch of science has come into existence within the last fifteen years. It occupies the ground between physics and chemistry, and bears the name of physical chemistry. New chairs for its advancement have been created in the universities, journals have been founded for its exposition, and a mass of technical literature has grown up around it. But to the general scientific and philosophical student it has remained a sealed book, and we therefore welcome the appearance of an elementary manual designed to place the results of this research within the reach of persons having an elementary knowledge of physics, chemistry, and mathematics. Of course, without the propædeutics of these three sciences it is impossible to approach the subject. To go at all deeply into it, the student must be familiar with the elementary calculus, and must have some knowledge of differential equations and the elements of thermodynamics. But even without these a fair knowledge of the field may be obtained.

Unlike some recent writers, the author of the present volume has not ignored the work of the older physical chemists, and he has devoted much space to the consideration of the labors of men like Kopp, Bunsen, and Regnault, and to the other great founders of chemical and physical science, it being his desire to prepare "a balanced book." It is to be hoped that his volume will contribute to the wide dissemination of the guiding ideas of this new branch of science, for they have extended into nearly every field of natural inquiry, including even, through the researches of Professor Loeb, the domain of biology. It will be no small source of pride to American readers of the book to learn that one of the principal contributions to the subject has been made by an American physicist, Prof. J. Willard Gibbs, of Yale. *μ.*

GESETZE ÜBER DAS URHEBERRECHT IN ALLEN LÄNDERN, nebst den darauf bezüglichen internationalen Verträgen und den Bestimmungen über das Verlagsrecht. Zweite Auflage. Durchgesehen von Professor Ernst Röthlisberger. Leipzig: Verlag von G. Hedeler. 1902. Pages, 418.

This work is a second edition of a valuable compilation of the copyright laws and treaties of all countries. The German text or translation of 250 different laws, treaties, instructions, etc., is given, and the revision of the volume has been undertaken by Prof. Ernst Röthlisberger, who as secretary of the Bernese International Bureau for Intellectual Property, is regarded as a foremost authority on copyright matters. The work has been brought down to date, the matter is alphabetically arranged, and a list of contents will be supplied gratis by the publisher. The book will be useful to all publishers and authors who need information on matters of international copyrights.

STUDENT'S PÂLI SERIES: PÂLI FIRST LESSONS. By *Rev. H. H. Tilbe, Ph. D.*, Professor of Pâli in Rangoon Baptist College. Rangoon: American Baptist Mission Press, 1902, 12mo., pp. x, 124.

This is the first Pâli Primer that has been published for Western students. We have had several Pâli grammars and even readers, such as the grammars of Clough, Minayeff, Kuhn and Müller, and the Readers of Elwell and Dines Anderson (though the last I have not yet seen); but for a genuine primer, where the beginner has everything explained step by step, the present little book is the first. It consists of six Jâtakas (Nos. 151–156) with literal translations and vocabularies. Each reading lesson is accompanied by a table of every word and grammatical form, making a number of short vocabularies. At the end there is a general vocabulary of forty pages. Roots are given and prefixes pointed out. The book is much better printed than the author's *Pâli Buddhism*, and I can recommend it to every beginner in Pâli. It would have been a great boon to myself in 1895, when I first took up that language.

ALBERT J. EDMUNDS.

DIE TRANSCENDENTALE UND DIE PSYCHOLOGISCHE METHODE. Eine grundsätzliche Erörterung zur philosophischen Methodik. Von *Dr. Max F. Scheler*. Leipzig: Verlag der Dürr'schen Buchhandlung. 1900. Pages, 178. Price, 4 Marks.

Dr. Scheler has attempted in this volume an exhaustive discussion and exposition of what he regards as the philosophical method *par excellence*. He has endeavored to combine the transcendental method so called with the psychological method. The present situation is one that in the author's opinion imperatively demands a reconstruction of philosophical ways of procedure, and the question, as Dr. Scheler puts it, is not contained in Windelband's maxim that "To understand Kant is to transcend Kant," but rather "*How* shall Kant be transcended." That this has yet been done Dr. Scheler cannot bring himself to admit, even in the face of the many admirable contributions that have latterly been made to philosophy.

Under the influence of Professor Eucken, the philosophical method which Dr. Scheler has developed is termed the noölogical method. The following are some of the results: Apart from the principles of formal logic, there is no absolutely solid or self-evident datum from which philosophy in any of its forms may proceed. Neither the axioms of mathematics, nor theorems of physical science, nor "experience" in the transcendental sense, nor sensation, are entitled to lay claim to the dignity of such a datum. The transcendental method is quite inadequate for treating the problems of philosophy; so is the psychological method. The noölogical method is an attempt to combine the divergent methods of procedure of the transcendental philosophy and the transcendental psychology. Its fundamental concepts are: "World of work" (*Arbeitswelt*) and "form of spiritual life" (*Geistige Lebensform*). By "world of work" are understood the relations recognised as interconnecting the achievements of human civilisation; it is not in itself a self-

evident datum, but a "well-grounded phenomenon." Mind, and therefore also its constituent "intellect," is at the beginning of the quest for its contents a perfectly problematic conception. It is the x that renders the "world of work" possible. Inasmuch as the "world of work" is being continually enriched by the progress of human history, it is not possible to say precisely at any one point in history what the conception of mind is. A systematic deduction of *à priori* principles for "all possible experience" is impossible. The formal principles have too much contents to hold valid for all possible historical experience, and have too little contents to be vigorously applied in any actual historically-determined civilisation.

Such is the sum of Dr. Scheler's philosophy. It will be seen that it conforms in many respects to the spirit of our time, which is gradually drifting away from the anchorage of the formal philosophy of which Kant was the greatest exponent, and of that ideal of rigor which the stupendous development of the mathematical and physical sciences in the eighteenth and the first part of the nineteenth centuries had established as the goal of perfection which research in every department of human inquiry should strive to attain.

Dr. Scheler's work is not uninstructive reading, and his discussions of some of the present dilemmas in philosophy are not without value. *μ.*

THE UDANA, OR THE SOLEMN UTTERANCES OF THE BUDDHA. Translated from the Pâli by *Major-General D. M. Strong, C. B.* London: Luzac & Co. 1902. Pages, vii, 129. Price, 6 shillings net.

The *Udana* is a Buddhist book the significance of which has long been understood by Pâli scholars, and many important passages have been translated on various occasions by different scholars. Here we have for the first time an English translation which presents the whole of the book containing the solemn utterances of the Buddha. In a certain sense, the *Udana* ranks as high as the *Dhammapada*, which contains the moral code of the Buddhists, the *Sutta Nipata*, poems of instruction, the *Dhammachakkappavattana Sutta*, the story of the *Foundation of the Kingdom of Righteousness*, and kindred canonical scriptures. It is more philosophical than other books, and discusses the principal doctrines, such as the nature of enlightenment, the non-existence of the ego, or the âtman, the existence of the eternal, the nature of being, etc., etc.

General Strong in his introduction touches upon the most essential points of Buddhism, selecting the following: First, the three characteristics which are that all constituents of being are (1) transitory, (2) that they are misery, and (3) that they are lacking in an ego. Secondly, the only ideal that in the opinion of the Buddhist is worth striving after is the perfect life, or saintship, and this ideal is to be reached by emancipation from desire. Thirdly, salvation does not come by belief, but by keeping the precepts, as is stated in the famous lines: "To commit no evil, to do good, to purify the heart, that is the teaching of the Perfect One."

Fourthly, Nirvâna is the extinction in the heart of lust, ill will, and dulness or stupidity.

As to an "infinite first cause" (such is the expression of General Strong), Buddhism declares that "the Uncreate exists," and "if thou knowest the Uncreate, thou hast found deliverance."

The continuity of identity is constituted by Karma, or deeds, and Buddhism includes representations of a cyclic or evolutionary theory of existence, including the assumption of the origination and dissolution of innumerable solar systems.

A few quotations from General Strong's translation of the *Udana* will characterise the book:

"Purification cometh not by water, though the people bathe ever so long;
In whom truth and religion abide, that man is pure, he is a Brahmana."

"Whatever of sensual pleasure there may be on earth, or in the kingdom of the gods,
It is not worth a sixteenth part of the joy which springs from the destruction of Desire."

"He who seeking his own pleasure, does injury to the living,
For such a one there is no happiness hereafter.
But he who seeking his own pleasure, injures not the living,
For such a one there is happiness hereafter."

"Happy is that upright and learned one who has no possessions!
See how the rich man is troubled;
How one man is in bondage to another."

"As the mountain rock unshaken stands
So, delusion slain, the Bhikkhu
Like to a mountain, trembles not."

"He who keeps not watch over his body,
Who is under the spell of false doctrines,
Who succumbs to sloth and torpor,
Such a one passes into the power of the Tempter.
But he who keeps watch over his mind,
Whose sphere is right thoughts,
Who sets ever before him right doctrine,
Who knows the 'rise and set' of things,
Who overcomes sloth and torpor,
That Bhikkhu escapes from all states of punishment."

"It is easy for the good to do good,
It is hard for the good to do evil,
It is easy for the evil to do evil,
It is hard for the Saint to do evil."

P. C.

La perception visuelle de l'espace. Par *B. Bourdon*, Professeur de Philosophie à l'Université de Rennes. Avec 143 Figures. Paris: Librairie C. Reinwald. 1902. Pages, 442.

A short sketch of the problem which Professor Bourdon has treated will be of value in determining the scope of his work. We are sensible by our organs of sight, of light and of colors on the one hand and of space, magnitudes, forms, position, movements, and depths on the other. The relative independence of these two groups of perception is easily shown; for the same forms continue to persist, whatever be the colors we impart to them; letters printed in blue retain the same shape as they would if they were printed in red. The perception of colors is retinal, which is not the case with the visual perception of space. This is produced by tactile, muscular, and articular sensations (coming mainly from the eyelids, the muscles of the eyes, the muscles which produce the movements of the head and the articulations concerned in these movements). Thus, when we fix our gaze upon an isolated point and perceive that it lies to our right, sensations other than those emanating from the retina must intervene in order to inform us of its position. For example, if the body and the head are at rest we must turn our eyes to the right to fixate this point, in which case determinate tactile and muscular sensations of the eyes must be produced. If the point afterwards passes to the left, and if we continue to fixate it, the image will not change its place upon the retina, but the tactile and muscular sensations will be modified, and will enable us to recognise that the point has passed to the right.

Now, it is to the study of such problems as the foregoing that Professor Bourdon's book is devoted. The book covers some four hundred pages and presents a comprehensive study of the visual perception of space. The author has endeavored to exhibit in a clear and simple manner the essential facts involved in this perception, to distinguish in the phenomena studied the part played by each cardinal species of sensations, and to fix this part quantitatively by numerous determinations. He has restricted himself almost entirely to fundamental points. His main thesis is that the perception of spatial depth by convergence is due to the sensations excited in the muscles of the eyes, and that the perception of positions to the right, to the left, above, and below, by means of changes in the direction of the gaze produced by simple movements of the eyes, is due to tactile sensations of the pupils. The author has drawn largely upon the work of the physiologists, like Hering, Helmholtz, Aubert, Volkmann, and Donders, and on that of psychological physicists like Mach. The book is well indexed and will serve admirably for orientation in the research of this field.

Il pentimento e la morale ascetica. By *Zino Zini*. Torino: Fratelli Bocca, Editori. 1902. Pages, xii, 232. Price, L. 3.

The present volume, while devoted to a historical and comparative investigation of Christian and scientific ethics, is quite practical in its purpose. The author

avows that he has approached his subject in the impartial spirit of objective criticism and entirely without any preconceived notions. He believes that he has furnished ideas of value regarding the conflict of the old ascetic ethics with modern scientific ethics,—ideas, too, that are little known and that would be serviceable in the construction of a rational system of rules of conduct. There is a crying need, he says, of rescuing humanity from a system of ethics which is exclusively religious and which takes its origin neither in fundamental concepts nor in a scientific criticism of good and evil, and which is interpreted either in a traditional or ecclesiastical sense. Mankind must be furnished with a new system of ethical education, the foundations of which shall be reasoned convictions concerning the nature of good and evil, and the fruit of a broader and profounder knowledge of the causes and the laws controlling the actual moral facts. The author exhibits a wide acquaintance with both ecclesiastical and modern scientific literature. *μ.*

A History of Political Theories Ancient and Mediæval. By *William Archibald Dunning, Ph. D.*, Professor of History in Columbia University. New York: The Macmillan Co. 1902. Pages, xv, 360. Price, $2.50.

Professor Dunning attempts to supply in the present volume a decided want in the literature of political science, and in many respects he has admirably succeeded. There is no existing treatise which covers exactly the same ground. Scarcely any attention has been devoted either in England or America to the history of political theories, and one can point in these countries to no serious attempt "to trace out in origin and development the life of political ideas in the broad field of the world's progress." Blakey's *History of Political Literature* is characterised by Professor Dunning as "crude, scrappy, and superficial." Sir Frederick Pollock's *Introduction to the History of the Science of Politics*, while scholarly and adequate, is very brief. Surprising as it may be, not even in Germany, where the activity of scholars in all phases of historical research is enormous, does there exist a complete history of political theories. Mohl's useful work is little more than a classified bibliography of politics; Hildenbrand's excellent treatise was never completed, and the first volume reaches only to the close of classical antiquity. Bluntschli's solid production deals only with the period since the thirteenth century, and is devoted primarily to German literature; and lastly, Janet's "elaborate and most admirable work avowedly exhibits political theory in its relation to ethical doctrine."

Professor Dunning's aim, now, has been to be more comprehensive than Pollock, Bluntschli, and Hildenbrand, more systematic and accurate than Blakey, more historical and less bibliographical than Mohl, and, as contrasted with Janet, "to present rather an interpretation of the development of political theory in its relation to political fact." He has endeavored to trace through all antiquity and through the Middle Ages the history of all well-defined ideas "in reference to the origin, nature, and scope of the authority through which the relations of the mem-

bers of the community to one another are determined." He has excluded, however, primitive political theory, and limits his work to the philosophy of the European Aryan peoples. Thus, he has considered the constitutional basis of Greek theory, the political philosophy of Plato, the politics of Aristotle, the political theory of later Greece and of Rome, the development of Mediæval institutions, political theory in the early Church, the theories current during the development of ecclesiastical hegemony, the political philosophy of St. Thomas Aquinas and his school, the theories which were rife during the decline of the Papal hegemony, the passing of the Middle Ages, and finally, he has devoted a considerable chapter to Macchiavelli.

The select references to literature and the bibliography afford excellent guides to the student, and there is a good index. *μ.*

L'Imagination et les mathématiques selon Descartes. Par *Pierre Boutroux*, Licencié ès lettres. Paris: Ancienne Librairie Germer Baillière. Félix Alcan, Éditeur, 108 Boulevard Saint-Germain. 1900. Pages, 45.

Analytical geometry constituting the most distinctive and glorious achievement of the French philosopher Descartes, and the object of that branch of mathematics being to eliminate visualisation altogether from geometry and to subject its development to the mechanical operations of algebraic machinery, it has been quite generally supposed that Descartes actually proposed to restrict to the utmost the part played by imagination in mathematical inquiry. Reason alone, he is said to have contended, can arrive at knowledge in the truest sense of the term, and as Comte has remarked, this principle is the very gist and essence of analytical geometry. On the other hand, a passage is found in the second part of the *Regulæ* treating of applied logic, where it is said that imagination is the indispensable auxiliary of reason. Here, therefore, is an apparent contradiction which it has been the purpose of M. Boutroux to remove in this little pamphlet published in the Library of the Faculty of Letters of the University of Paris. The author shows that the foundations of Descartes's mathematical method are contained in his metaphysical principles, and that the philosopher's attitude toward the problem here at issue is determined by the general philosophic attitude which he took with regard to the question of the relation between "body and soul" conceived as two distinct substances. *μ.*

A. Von Köllikers Stellung zur Descendenzlehre. Ein Beitrag zur Geschichte moderner Naturphilosophie. Von *Dr. Remigius Stölzle*, ö. o. Professor der Philosophie an der Universität Würzburg. Münster, i. W.: Druck und Verlag der Aschendorffschen Buchhandlung. 1901. Pages, 172. Price, 2 Marks.

Some years ago, we devoted several pages of *The Monist* (Vol. VIII., p. 150 et seq.) to the consideration of Dr. Stölzle's book on Karl Ernst von Baer. Dr.

Stölzle there exhaustively considered the scientific attitude of the great embryologist toward Darwin's theory of descent, and made use of Baer's position for the purpose of repudiating Darwin's theories. He has now attempted a similar task in connection with the work of the biologist Kölliker.

Dr. Stölzle believes in the theory of descent as an hypothesis of a high order of probability, but as a dogma nevertheless. The weight of the evidence, however, is so overwhelming that even Dr. Stölzle admits that there is nothing at present militating against it in its general and purely logical formulation. He has turned therefore to the controversies which center about the *causes* which have been assigned as adequate for the formation of new species. Are these causes internal or external causes? Is the explanatory factor the "selection" of Darwin, the use or non-use of Lamarck, and so on? Here, he remarks, is where confusion reigns, and here let us also remark is the point at which the reactionary thought of the day takes its stand. It is nothing short of amusing to observe how Dr. Stölzle has selected for criticism from Kölliker's labors the points which militate against his own philosophical position, and how he chooses for commendation the doctrines which make for its maintenance. For example, as errors of Kölliker are mentioned his mechanical conception of the universe, his denial of teleological principles, and his denial of the necessity of a creator. Of enduring value and exemplars of truth are his critique of Darwinism, his acceptance of interior causes, and his assertion that all theories of descent were possibilities only and could never hope to acquire the full evidence of experiments admitting of repetition.

But entirely apart from the "purpose" that pervades Dr. Stölzle's book, his review of Kölliker's labors will be of value to students who are desirous of obtaining within brief compass a synoptic view of the work of one of the most prominent of modern biologists. *μ.*

Typical Modern Conceptions of God, or The Absolute of German Romantic Idealism and of English Evolutionary Agnosticism. With a Constructive Essay. By *Joseph Alexander Leighton*, Professor of Philosophy in Hobart College. New York: Longmans, Green & Co. 1901. Pages, xii, 190. Price, $1.10.

Professor Leighton has gathered together in this volume certain philosophical essays which he published in *The Philosophical Review* and had previously submitted in another form to the faculty of Cornell University in partial fulfilment of the requirements for the degree of doctor of philosophy. He has considered the theologic views of four philosophers, viz., Fichte, Hegel, Schleiermacher, and Spencer, whom he has selected "because of the typical and partially complementary character of their respective treatments of the problem of the Absolute—the problem of the metaphysical conception of God." To each of these philosophers he has devoted a chapter; the concluding essay of the work being an outline-treatment of the problems which most troubled Professor Leighton's mind during his

studies, viz., "the problem of the relation of the One and the Many, and even more prominently the relation of the Absolute to Time."

The discussion is entirely of the ultra-metaphysical sort, and is concerned with the ontological difficulties which have perplexed the philosophers of absolutism from the beginning of all time; such "apparently insoluble contradictions," for example, as that of "a time world and a Timeless Absolute," of a "progress in finite intelligence and an unchanging Absolute Individual as the ground of this progress," etc., etc. μ.

PHILOSOPHENWEGE, AUSBLICKE UND RÜCKBLICKE. Von *Karl Joël*, Professor an der Universität Basel. Berlin: R. Gaertners Verlagsbuchhandlung, Hermann Heyfelder. 1901. Pages, x, 308. Price, 6 M. Bound, 7 M.

Professor Joël, who holds the chair of philosophy in the University of Basel, the same who wrote a book on the genuine and the Xenophontic Socrates, has written a book entitled: *The Ways of a Philosopher; Outlooks and Retrospects*, in which he speaks in an easy and pleasing style of the future of philosophy, the age of ethics, the new spirit, the heart of science, the battle arrays of power and love, women in philosophy, philosophical marriage, the sphinx of pessimism, Stirner (a prominent advocate of Nietzsche's philosophy), and philosophy and poetry.

L'ANNÉE BIOLOGIQUE. COMTES RENDUS ANNUELS DES TRAVAUX DE BIOLOGIE GÉNÉRALE. Publiés sous la direction de *Yves Delage*, Membre de l'Institut, Professeur a la Sorbonne, Directeur de la Station Zoologique de Roscoff. Avec la collaboration d'un Comité de Rédacteurs. Secrétaire de la Rédaction Alphonse Labbé, Chef des travaux de Zoologie à la Faculté des Sciences de Paris. Cinquième Année 1899–1900. Paris: Librairie C. Reinwald. 1901. Pages, lxxvi, 676.

The enormity of their task of digesting and cataloguing the biological literature of each year appears to have dawned forcibly upon the editors of the *Année Biologique*, and they have in the present volume compressed the labors of nearly two years, bringing the work in all essential respects down to the close of the year 1900. They have been obliged, however, to defer the publication of the botanical portion until the coming year. Thanks to a more rigorous control of the reviews and analytical summaries, and to the strict elimination of what does not directly concern biology, the present volume, although covering two years, is not larger nor more expensive than its predecessors. The editor hopes in this way to publish future volumes promptly, with less expenditure of labor and space, and to fulfil precisely the same purposes. The reader will find in this book, which is indispensable to workers in biology and to all who have occasion in other sciences to consult biological literature, all the references and bibliographical information that he is ever likely to need. μ.

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